

**British Society for the  
Study of Orthodontics  
1942-43**





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TRANSACTIONS

OF THE

British Society for the  
Study of Orthodontics

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1942 & 1943

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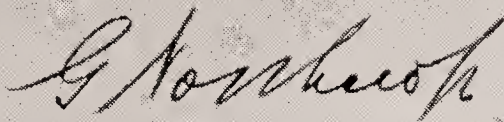
Oct. 15th 1907.

Dear Sir,

It is proposed to found a Society having for  
it's object the promotion of the study of Orthodontia.

If you are sufficiently interested in the subject,  
will you meet me, informally, at the above address, on  
Monday next, Oct. 21st, at 8.30 ?

Yours faithfully,



### GEORGE NORTHCROFT, 1869-1943

When a man of note dies his contemporaries are reminded of the things he has accomplished, especially if one of those things has been the founding of a society. Members who may have joined that society in later years are often indifferent to its history, and may regard its birth as of spontaneous generation.

The letter at the head of this page is documentary evidence, if such a thing were needed, that the founder of the British Society for the Study of Orthodontics was George Northcroft. For some time the idea had been simmering in his head stimulated by intimate talks with Harold Chapman and other friends who met at his house in Harley Street. The leaven had thus begun to work which called forth the letter suggesting the formation of a society. The title of the society was debated and Northcroft had consulted authorities on etymology as to the best one and very dear to his heart was "The study of Odonto-Prosopic-Orthopædics." It was a comprehensive term and not a hybrid; he was overruled and the bastard word "Orthodontia" held the field for a short time when it was formed out and replaced by one of purer descent "Orthodontics."

On December 5th, 1907, the inaugural meeting was held at the rooms of the Medical Society of London, 11, Chandos Street, W.1; rooms so well and so affectionately remembered by those members who met there before the removal in 1931.

J. H. Badcock was elected the first president. The closing paragraph of his address shows with characteristic rectitude the president's desire that honour should be given to whom the honour was due, the man who had created the society:—

"You may not all know that it is to Mr. George Northcroft and to him alone, that this society owes its inception. The dental world was supersaturated with orthodontic interest. Mr. Northcroft made the necessary movement and the British Society for the Study of Orthodontics crystallised out forthwith.



We thank him and hope that his labours will bear much fruit."

There evidently had been a friendly rivalry between these two modest men as to who should retire in favour of the other for the honour of being the first president of the new society, and George Northcroft had won. He was, however, president the following year.

In vacating the chair at the end of the first year the president showed "satisfaction in the knowledge that I shall be succeeded by Mr. Northcroft, than whom there is amongst us no man more able and more zealous."

The society had increased and the attendance was good, including, as it has always done, many members living at a distance from London.

At the January meeting 1909, George Northcroft took up his duties as president and, characteristic of the man, his address was on "Aims and Ideals," in which he appealed to the members to cultivate wide views "a knowledge of *all* methods and a proper understanding of how to apply that knowledge to individual cases."

He gave the timely warning not to overdo the correction of malocclusion, and not to regard it as the be-all and end-all of odontoprosopic-orthopædics. It was in this address that he first made that appeal which he repeated more than once, it apparently fell on deaf ears, "to preserve through a period of years, the models of young developing mouths, normal and abnormal." This practice he followed, and improved upon it by taking, in addition to serial models, serial masks of his son up to adult age. This is a remarkable and perhaps unique achievement with which his name will be associated as long as the society continues in existence; for it is the intention of the society to have a cabinet constructed to house these valuable specimens, which were presented to the museum of the society by Mr. Northcroft. The cabinet is to be called the "Northcroft Cabinet" in honour of the founder of the society.

If the attendance book of the society could be submitted to a statistician it is certain that the name of Northcroft would head the list in number of attendances and his name as author of articles and as demonstrator would appear closely rivalling few other ardent members. These articles and demonstrations were ever of a high value, and of great help to others for he was always ready to give advice and practical help to those whom he judged deserving and anxious to profit by them. He was the one dentist chosen by a committee of the Dental Board of the United Kingdom to form one of a group of four distinguished lecturers on the "Growth of the Jaws, Normal and Abnormal, in Health and Disease" in 1924; the other three were the anatomists Professors E. Fawcett, J. C. Brash and Sir Arthur Keith.

Northcroft was a consummate craftsman, accurate in all details always keeping abreast with new thought and discoveries, weighing these in a mind stored with accumulated knowledge, the results of observation and experience.

When the society arrived at its majority in 1929, he was unanimously elected its president for the second time. In his address he dealt with the subject which he had brought forward twenty years previously: "Malocclusion of the Deciduous Dentition." He was the first to dispel the complacent theory that the milk dentition showed no irregularity of occlusion. His influence is shown in the lessening opposition to any disturbance of these accepted early views which to-day are completely disproved.

George Northcroft had most of those characters which go to make the ideal dentist, and more, the ideal citizen, for his many natural gifts were trained and cultivated to a high degree by his own assiduity and uprightness. He was not satisfied with anything less than the best. His deeds serve as models for his successors and his memorials will endure.

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Members are reminded that “The Dental Record,” published monthly, contains full reports of the meetings of the B.S.S.O., papers and communications given at such meetings thus coming into general circulation before they are collected and published in the Society’s Transactions. Particulars regarding subscription to “The Dental Record ” can be obtained from the Manager, Brock House, 97, Great Portland Street, W.1.

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Headquarters of the Society : Manson House, 26, Portland Place,  
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Communications should be addressed to the HON. SECRETARY,  
Mr. R. Cutler, 8, Lower Sloane Street, S.W.1 ; or 3, Walpole Road,  
Surbiton, Surrey ; or any other officer particularly concerned.



## LIST OF MEMBERS

[February, 1944]

Members are asked to send the Hon. Secretary their most reliable mailing address if the one given is inaccurate or unsatisfactory.

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- |  |   |
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**SERVICE SECTION.**

Names of members believed or known to be in the Services for the duration, arranged in alphabetical order. The Hon. Secretary has full details of rank and branch of service of those members whose names are marked with an asterisk. Service members whose subscriptions are in arrear and who wish to avail themselves of mailing facilities are advised to get in touch with the Hon. Treasurer.

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\*Steadman, B. St. J., c/o Mrs.  
Steadman, 4, Streatfield Court,  
Streatham, S.W.16.  
\*Sturrock, J., 19, Wimpole Street,  
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Walther, D. P.  
Williams, P. Lloyd.

Members serving in the Dominions or Allied Nations Expeditionary Forces.

\*Franklin, Maj. G., No. 1 Plastic  
Jaw Surgery Unit, R.C.A.M.C.,  
Canadian Base P.O., England.  
\*Goldstein, Capt. M. C., U.S. Army

Air Forces, 323. Bomb Group,  
A.P.O. 638.  
\*Goosman, Capt. S. D., General  
Depot G.40, U.S. Army, APO.516A

DECISIONS APPROVED AT THE  
ANNUAL GENERAL MEETING, 5th DECEMBER, 1942,

1. The Financial Year to end on 31st October in each year.
2. A Special Committee to be formed within the Council to examine and report upon orthodontic teaching, research and treatment.
3. No Subscription payable for 1942, but the Subscription for 1943 should be paid.
4. The Officers for 1943 to be the same as for 1941.
5. That in addition to the Annual General Meeting, a Demonstration Meeting and one other meeting would be held.

DECISIONS APPROVED AT THE  
ANNUAL GENERAL MEETING, 4th DECEMBER, 1943.

1. Professional Auditors to be appointed.
  2. The Officers for 1944 be the same as those for 1943.
  3. Ordinary Meetings to remain suspended.
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# The Early Extraction of the First Permanent Molar as the best Method of Preserving the Dentition as a Whole

By A. A. WILKINSON, M.B., Ch.B., L.D.S.(Eng.).

SINCE 1913, when I started dental practice I do not remember having seen one adult patient of Anglo-Saxon parentage in possession of a complete dentition who was not overcrowded. In January 1934, Miss K. C. Smyth published in the Dental Record a paper "Some Notes on the Dentition of Anglo-Saxon Skulls from Bidford-on-Avon with special reference to Malocclusion." She states that of the skulls examined, 87 per cent showed malocclusion and that, let me remind you, was in 6th Century Anglo-Saxons.

An exhaustive investigation by the Medical Research Council in which many thousands of children were examined has led them to the conclusion that 90 per cent of present-day children showed all kinds and degrees of malocclusion. That, mark you, in children! What about adults?

Prof. Brash stated that "Although the frequency of some recognisable malocclusion is very great in the Bidford collection—yet the average *degree* of malocclusion is not nearly so great as in modern British people."

But anatomists and statisticians apart, we all see some hundreds of patients each year, and I want to ask now whether any of you have seen many full dentitions in Anglo-Saxons which were not overcrowded?

Even if you have, you will admit such a condition to be phenomenally rare, and are you sure they were Anglo-Saxons?

Since Christmas this year I have seen two adult patients with full dentitions who had no overcrowding, the first of whom had a Rumanian father and a Russian mother, and the other a French mother. Now if it is agreed that in completion of the dentition over 99 per cent of Anglo-Saxon mouths are overcrowded, and if it is conceded that the results of overcrowding are extremely undesirable, is it too much to suggest that routine steps be taken to reduce the number of teeth that the adult mouth should be allowed to accommodate?

I am going to suggest to you what in my experience are the results of overcrowding.

- (1) Irregularity of the teeth, resulting in a more or less serious degree of malocclusion, with impacted 3rd molars.
- (2) Caries—especially inter-proximal caries.
- (3) Conditions conducive to gingivitis.

In my practice it was our custom 20 years or so ago to do a considerable amount of orthodontic work, and I must confess that at that period I used calmly to watch the teeth of growing children becoming more irregular and overcrowded and do nothing about it until the time had arrived when, in my judgment, active orthodontic measures could be proceeded with.

In the meantime we always observed the 1st permanent molar decaying cheerfully away and, following the advice of Angle, we filled them again and again in a praiseworthy attempt to retain these

“ keystones of the dental arch ” until the orthodontic work, which nearly always became necessary, was completed.

I do not know how many mouths I ruined irretrievably in this manner before I realised three important facts.

- (a) That even if by orthodontic measures the malocclusion could be corrected, 3rd molars might wreck the best obtainable result when they erupted.
- (b) That no orthodontic case can be considered successfully completed till the 3rd molars are in occlusion.
- (c) And that practically no patients treated in this manner were caries-free.

I freely confess that in the first place simultaneous and symmetrical extraction was done chiefly to reduce the incisal irregularity which was such a constant feature of the patients I was accustomed to see, and to prevent impaction of the 3rd molars.

We did not always discard the 1st permanent molar. The 1st premolars were often removed, but with indifferent success—and by the simple but reliable method of trial and error we finally developed a technique which gives such astonishing results that I am not surprised that some of my fellow practitioners, who stick to the methods which I have discarded, regard my published results with a degree of incredibility.

I make a special point of asking my patients to bring their children to me from the earliest age—2 years old is not too early. I rattle a mirror round their mouths—tell the little boys what fun it is to bite food really hard—and the little girls how pretty their teeth are.

I insist that such habits as lip, thumb, finger and blanket sucking cannot be countenanced for a moment, and tell the parents how this can be stopped.

All temporary teeth are filled as soon as any caries appear, and a careful mouth hygiene is instituted.

By these means the deciduous teeth can be retained without difficulty—in point of fact I have not for many years had to remove any before they were due to be discarded.

When the permanent dentition begins to appear we see whether the teeth are wide, normal or narrow and if and what degree of incisal irregularity threatens.

I then X-ray the mouth to make sure that the premolars are present.

The 3rd molar germ cannot always be seen as early as eight, but in the presence of marked incisal irregularity I pay no attention to this.

The greater the degree of incisal irregularity the more early in my opinion is the removal of the 1st permanent molars necessary.

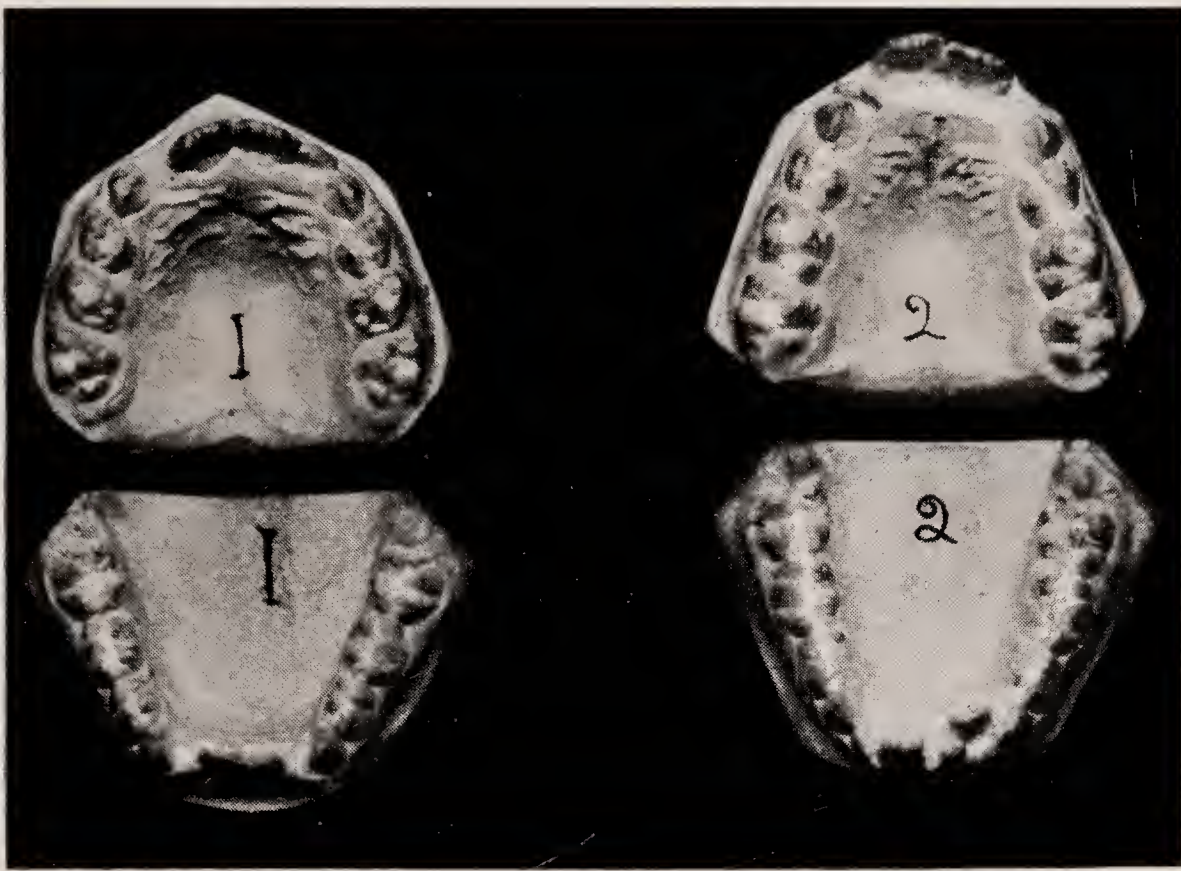
If there is little or no anterior crowding I may wait as late as 9 before extracting—but my partner and I are quite firmly convinced that the earlier the extractions the better the subsequent history of each patient.

A few years ago a girl of 8 erupted a right upper lateral with the labial surface of the tooth against the distal margin of the central—a full right-angle turn. I removed the 1st permanent molar without delay, and the tooth rotated into its normal position in about two years without any assistance whatever.

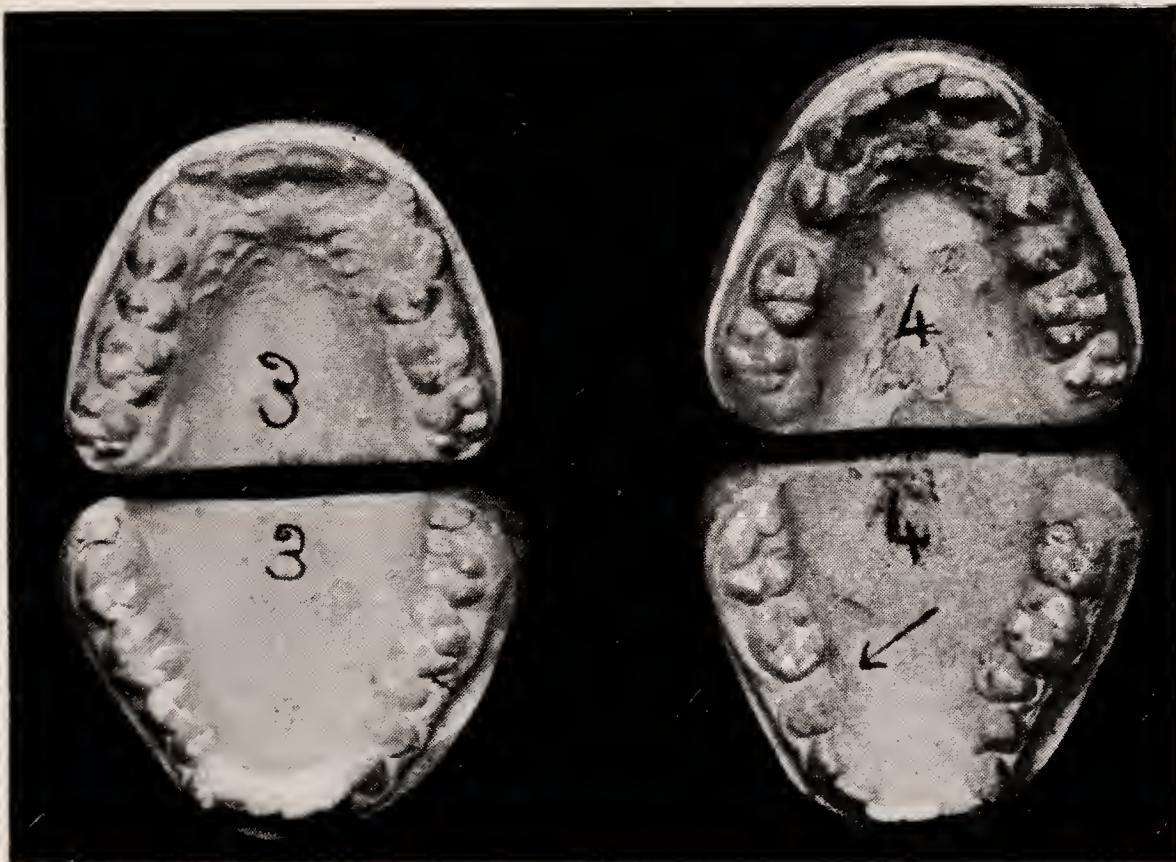
I should not make the statement I am going to make now without the most serious and searching investigation into my records, and I am fully aware of what the reactions of many of you will be, but here it is.

So far I have never filled a permanent tooth for any child from whom the 1st permanent molars were removed as early as 8 years of age. Last Friday morning (since this paper was written) I filled a small cavity in a permanent tooth for a child whose 1st permanent molars I removed when the child was 8 years of age. Naturally you will at once ask for how many has this been done ?





Figures 1 and 2 show the type of case that I treat by immediate removal of  $\frac{6}{6} \frac{6}{6}$ . They belong to (1) a boy and (2) a girl, both aged  $8\frac{1}{2}$ . In both cases the anterior irregularity disappeared in 18 months.



Figures 3 and 4 illustrate the condition in two attractive young girls, both aged 17-18, whose friends had said their teeth "spoilt" them. The impressions were taken when I first saw them. In 4 the arrow shows an unerupted  $\frac{5}{1}$ ; and the  $\frac{5}{1}$  was removed six months before I saw her because it "stuck out very badly." They both demanded to be made presentable, and 3 had 10 cavities and 4 had 15—mainly interstitial.



I have only 15 cases of over 6 years' standing, but since that date very many.

Among the cases of "8 years" extraction I have not yet discovered any snags. They do not show any greater percentage of close-bites than those children for whom extractions are done later. I have several of these models to show you, which I have been able to obtain recently.

During the month of April I had in my surgery 42 children from whom I have removed the 1st permanent molar at one time and another, and of these only 14 required any conservative treatment.

This, it must be remembered, includes not only my own patients but also those of absentee practitioners as well, and boys and girls from whom the extractions had had to be done at periods much later than I think to be the best age.

I dislike figures and statistics and understand less about mathematics than anyone I know, but if the deciduous dentition can be carefully attended to and the extractions done at the best time, we estimate that about 70 per cent of children are caries-free. When I refer to caries-free people I do not mean people who have had teeth filled and then have not shown any subsequent sign of caries; I mean people who have never at any time had any cavities filled in any of their permanent teeth.

This claim may sound fantastically high to those who have not tried early extraction of the 1st permanent molar, but in claiming 70 per cent freedom from caries in such patients I am sure I am making a conservative estimate.

Many of my critics have said they can understand that the extraction may reduce interstitial caries and irregularity, but ask how is it possible that occlusal cavities can be prevented in this manner? The only solution I am prepared to offer is that caries is a contagious disease, and once it is eliminated from the mouth, provided oral hygiene is maintained, it does not again readily obtain a footing.

My observations have led to the formation of opinions which have become convictions, and are as follows:—

- (1) Overcrowding is normal in the Anglo-Saxon mouth.
- (2) Overcrowding produces irregularity, almost any degree of mal-occlusion and/or impacted 3rd molars.
- (3) Overcrowding results in interproximal caries.
- (4) Overcrowding is conducive to chronic gingivitis.

If, furthermore, you do not agree that overcrowding produces No. 2, 3 and 4 in the above catalogue, let me assure you that if you will practise "decrowding" in conjunction with the other conditions laid down you will not remain long in doubt as to the benefits that can be conferred by this remarkably simple operation.

Furthermore, as I said earlier, it was our custom to have literally dozens of patients wearing orthodontic appliances 20 years ago. We used expansion arches, cribs, Badcock plates and all the devices known to and beloved by orthodontists to correct deformities.

Now, with the exception of an occasional "Baker Anchorage" for intermaxillary traction, we have practically eliminated the need for any orthodontic work. If you have a narrow arch and remove the 1st permanent molar, the amount of expansion that will occur in a year without any further attention is quite astonishing.

I have a model here of a girl who had a complete V-shaped arch. Her 1st permanent molars were extracted when she was 10 years of age, and she is now 25. She is entirely caries-free and has never worn an appliance of any kind.

Consider the economic aspect of the treatment. The patients require great care of the temporary teeth until they are finally discarded, extraction of 4 teeth, and in the majority of cases little if anything more.

By carrying out this treatment we give the children a 2-to-1 chance of remaining permanently caries-free, whereas there is a 1,000-to-1



chance against their remaining permanently caries-free if we do not "decrowd."

As the mother of 2 children of 19 and 17 (who had the extractions done at 8, now both caries-free and having beautiful teeth with perfect articulation) said, when for the tenth time they visited me and were examined and sent away rejoicing, "It is like making them a present of £500 each." That was how she felt.

Let us now consider the contra-indication for early extraction. They are marked meso- or disto-occlusion, in which cases the deformity must be corrected and stabilized before the extractions are done.

If one gets the patients early enough, however, this treatment can be completed before the age of 9. Certainly it is easy to finish it by the age of 10. If the 2nd molar roots are not more than half grown it is quite safe to extract the sixes and there will not be any undue tipping. Early loss of the deciduous molars is another contra-indication, and in such cases I make a practice of using space retainers until the premolars erupt. The age at which this occurs naturally varies considerably, and the length of the roots of the 2nd molars must be ascertained by X-rays before we undertake the extractions, and in such a case it may be wise to defer this until the 2nd molars are in occlusion, but you will not get caries-freedom that way.

Some years ago I was called in to see a boy of 8 who had his upper and lower incisors erupted, and all the other teeth decayed down to gum level with several abscesses. His parents were both educated and wealthy, and heartily abused by me. I decided to clear the mouth, leaving, of course, the incisors, which fortunately were not affected. He is now about 25, and when last seen was caries-free and in possession of a dentition which was in every way perfect, and he had not a trace of close-bite. Another contra-indication which is by no means uncommon is absence of any of the premolars. This developmental defect can, of course, only be ascertained by X-rays, and in the number and position of absent teeth the subsequent treatment depends.

Some years ago X-rays revealed that a patient of 9 years old had only one premolar developing and would, therefore, be seven teeth short throughout life. Obviously a case for preserving his permanent teeth at all costs. I removed his deciduous molars forthwith and all the posterior teeth moved forward without tipping, and now at 26 he has an excellent dentition with the first molars against his canines, except for the one premolar. All the first molars have been filled, but otherwise he is caries-free.

With regard to close-bite, it occurs in some cases, but I do not often see it. It is in no way associated with the extraction of the sixes if the extraction is done at the right time. Close-bite, in my opinion, is one of the complications of postnormal occlusion. I have a model of a case in point. This child was brought to me for the first time a few days ago, at the age of 9. His incisors are extremely irregular, he has a close-bite, and he is postnormal on both sides—a full cusp on one side and half a cusp on the other side. I extracted his sixes at once, and I gave him a vulcanite bite-plate to open his bite. Everything in the mouth will have a distal drift straight away, and the laterals, which are erupting at right angles to the normal position, will rotate round into their normal position because of the room which the distal drift gives them.

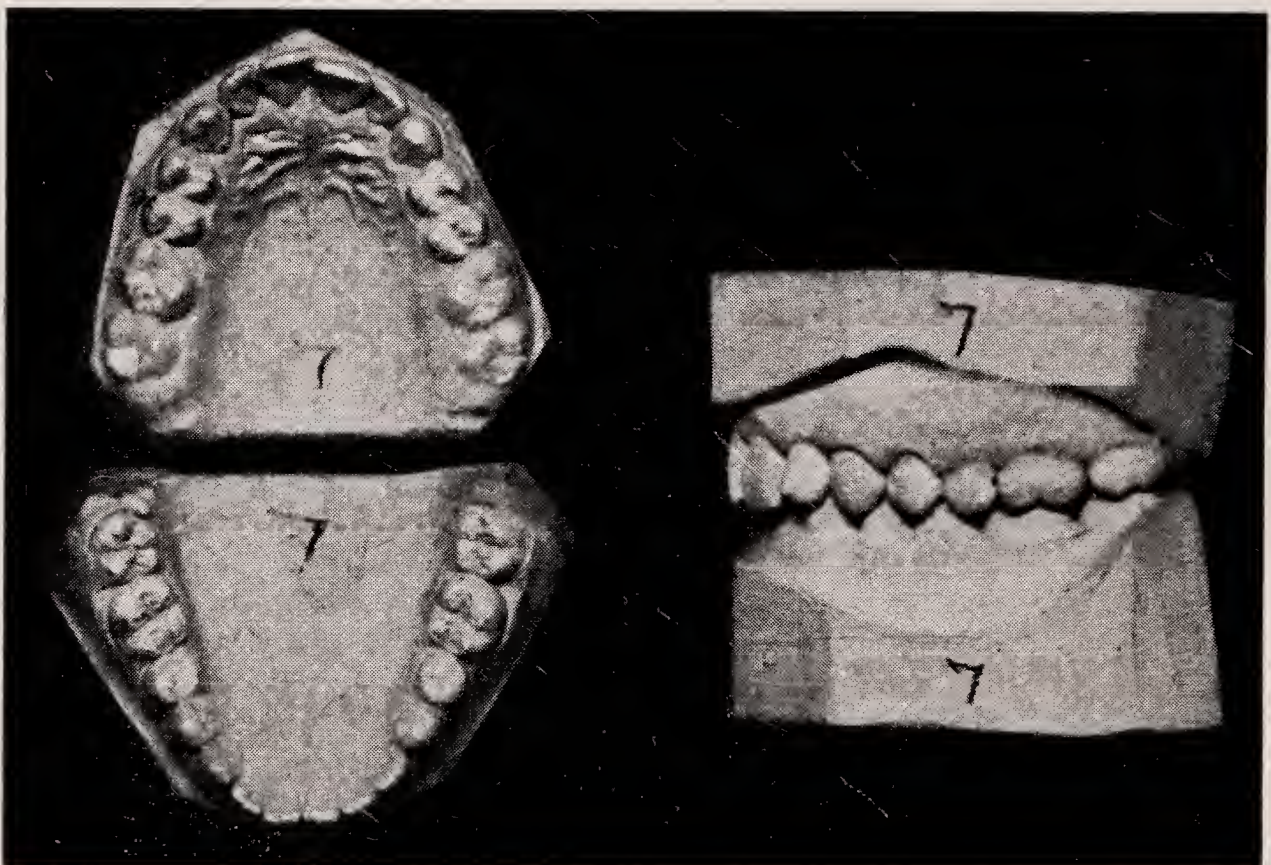
I suggest that one reason for close-bite may be that younger children exert less force in mastication than children of more mature age. It may also be connected with the fact that some premolars take a longer time to erupt into full occlusion, and sometimes the temporary molars are all discarded within a short time of each other and there is no posterior support for the bite. But it is the simplest condition to treat and never relapses when properly treated.

My own plan is to give such patients a vulcanite plate which must

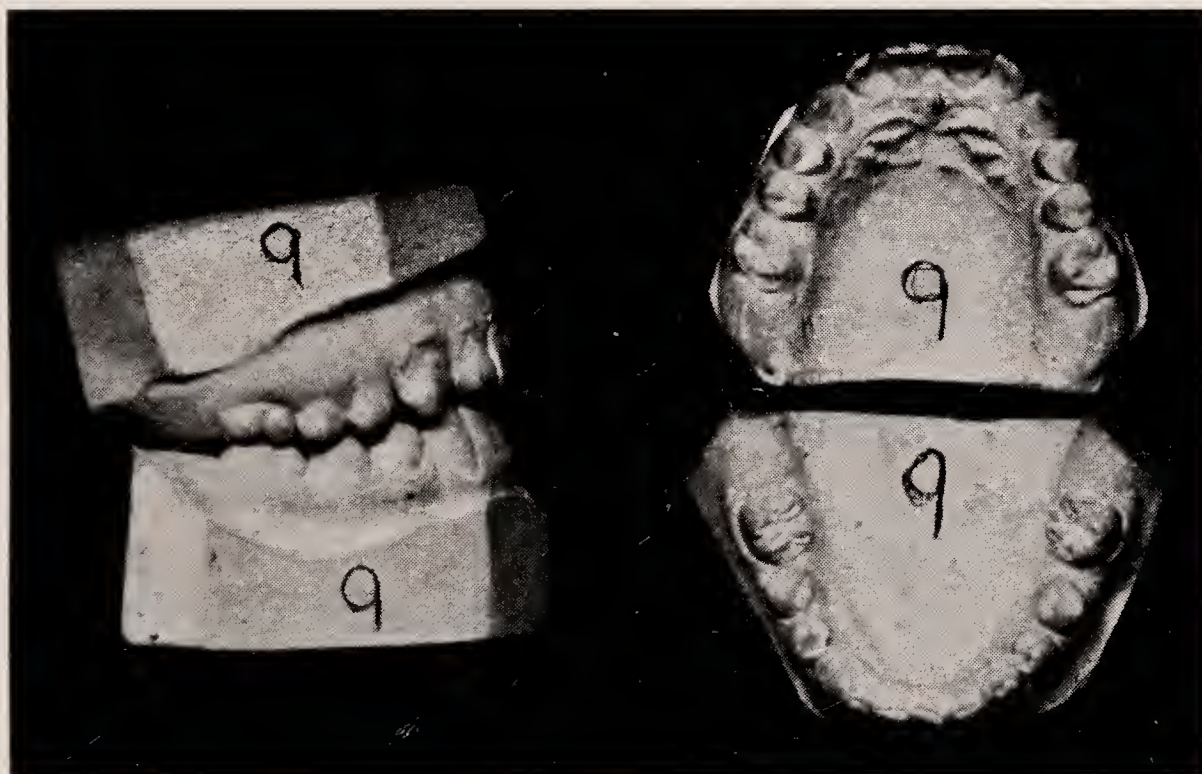
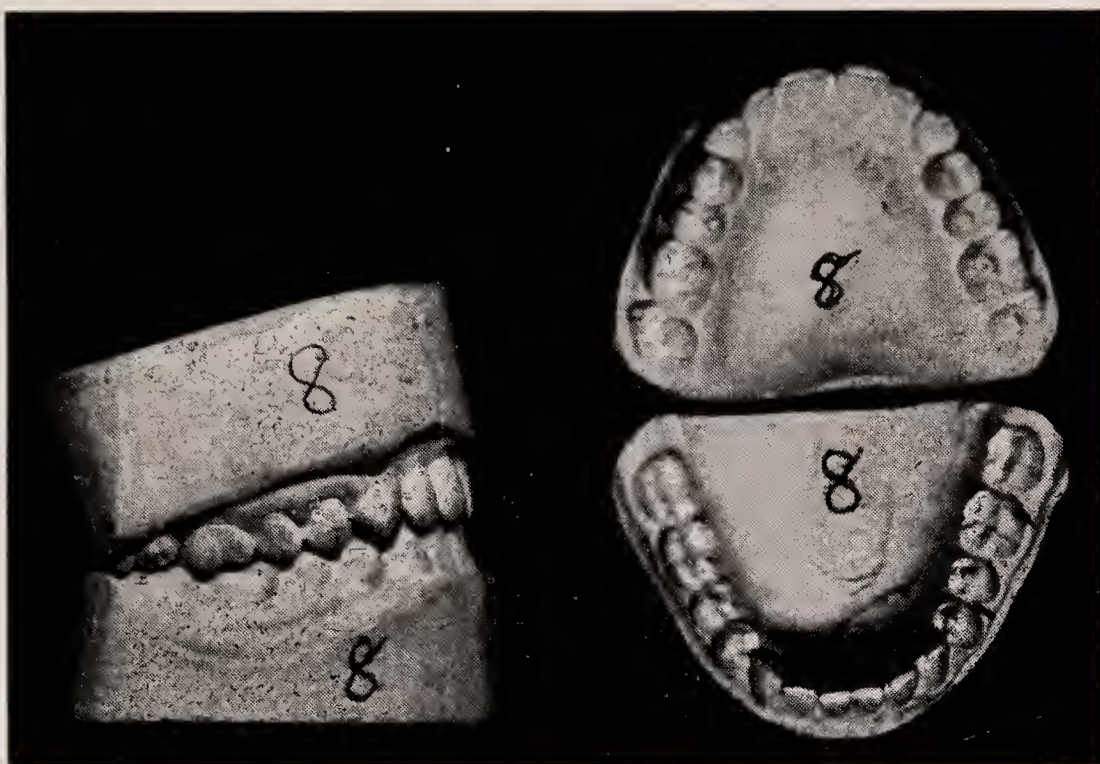




Figures 5 and 6 show children of 12 years of age whose anterior teeth prior to extraction were very irregular indeed. None of these patients ever had to wear any orthodontic appliances.







Figures 5-6-7-8 and 9 illustrate the results of extraction of  $\frac{6|6}{6|6}$  about the age of 8. They are all entirely caries-free. No. 8 is 30 years old, No. 7 is 24, No. 9 is 17, and possesses several points of interest.  $|6$  was removed about 2 years after the others, as her parents left the district before the extractions could be completed. It will be seen that  $|7$  has rotated a little and is not quite close up to the premolar as is the case on the other side. But most interesting of all is that the treatment cost the parents 5 guineas, whereas her mother paid nearly £300 for orthodontic treatment, and now at the age of 41 her mouth presents a sorry picture, all but three of her remaining teeth have been filled and  $\frac{65|456}{65|50}$  have already been lost.



be worn day and night, meal-times especially, which takes the bite on the lower incisors and prevents the posterior teeth occluding.

The length of time required for the posterior teeth to erupt into full occlusion varies, but it should seldom be more than eighteen months, and the plate can be thickened from time to time to raise the bite till one is satisfied with the position obtained. I have a model here of a child who had her sixes extracted at the age of 10 and she is now 11½. There is a considerable gap at the back and no posterior support, but there is no trace of a close-bite. Therefore it cannot always be due to lack of posterior support.

#### CONCLUSION.

My conclusions, based on 29 years of continual experience of this treatment, are as follows:—

- (1) "Decrowding" the mouth is essential in every case.
- (2) If the normal number of teeth is developing, extraction of the 1st permanent molars gives a result which is incomparably better than that following any other form of decrowding.
- (3) Removal of these teeth results in 70% of cases in complete absence of caries, absence of irregularity and therefore of conditions predisposing to gingivitis—always provided that the mouth has been carefully treated from early life, reasonable attention has been paid to diet and the extractions have been done at the best age.
- (4) The best age at which to extract is from 8 to 9.

What is the best service we can render to our patients in dental practice? Is it not to present them with teeth that are pleasing to look at while efficient to perform their allotted task, in which the danger of caries is minimised and the menace of pyorrhœa reduced?

I suggest there are but two ways of achieving this happy result. The first is to make them complete dentures, and the second is to remove the 1st permanent molar before the patients are 9 years old. I prefer the latter.

#### DISCUSSION

**Professor E. S. Friel** said that he would first like to congratulate Mr. Wilkinson on his partial reform. He thought that by the end of the meeting it would be a complete reform. In his paper published in the *British Dental Journal* in October, 1940, Mr. Wilkinson made only two exceptions to his rule that all children had to have their first permanent molars removed; the first exception was some "phenomenally rare cases" and the second exception was children who were shown by radiographs to have missing permanent teeth. As Mr. Wilkinson now said, the third permanent molars were not always visible at 8 years of age, and sometimes they were not visible even at 9 years of age. It would be very unfortunate if a child had his or her four first permanent molars removed and at a later age was discovered to have no third molars, with the result that the child had to put up with four second molars for the rest of its life. In the present paper Mr. Wilkinson gave a number of exceptions to the rule that children should have their four first permanent molars extracted. There was the large group of cases with malrelation of the arches and there was also the large group of children who had had premature extraction of their deciduous teeth.

Was it any wonder that all the members of the Society became greatly perturbed when they read Mr. Wilkinson's paper and found that 90 per cent of orthodontists were going to be put out of work? He did not think it would be quite as large a percentage as that. He had examined 100 models of orthodontic cases, Nos. 1,500 to 1,600, and had found that 60 of them had bad malrelation of the arches, so that only 40 were left for the early extraction advocated by Mr.

Wilkinson, and he thought that a good many of those 40 cases must have been the "phenomenally rare cases" to which Mr. Wilkinson referred.

Mr. Wilkinson claimed a 60 to 70 per cent reduction in caries as a result of the extraction of the four first permanent molars, but it must be remembered that that reduction was calculated after the four most vulnerable teeth had been removed. There had been a great deal of work done in the last few years on the prevention of caries, and that work had not been of a defeatist character. The workers had been trying to prevent caries in the whole dentition, and they included Lady Mellanby with her vitamins, Sprawson with his raw milk, the Bournemouth School with their tablets, and many American workers, such as Price and Howe. In the issue of the American Dental Association's journal for January of this year there had been published a paper by Howe, White and Elliott on the prevention of caries in children attending the Forsythe Dental Infirmary in Boston. That prevention was brought about by improving the diet of the children. They were working-class children and the cost of their diet could not be increased, but their parents were instructed to buy more suitable food, to cook it in a more suitable way and to give it to the children at more suitable times. In that case there had been a 56 per cent reduction in caries, including the four most vulnerable teeth. He thought it would be agreed that if Howe had eliminated the four first molars from his statistics his reduction would have been as high as if not higher than Mr. Wilkinson's 60 to 70 per cent.

It was stated in the paper that more than 99 per cent of people of Anglo-Saxon descent had crowded mouths. How did Mr. Wilkinson prove that they were of Anglo-Saxon descent? Did he go into the genealogical trees of all the people to find whether they were of Anglo-Saxon descent in the same way as Hitler did with his Aryan descent, or did he just assume that they were Scotsmen or Welshmen or Englishmen and then call them Anglo-Saxons? He himself could not believe that more than 99 per cent of people of Anglo-Saxon descent had crowded mouths. He was not in a very good position to speak on the subject, because he was not in general practice and all the children whom he saw had malocclusion of the teeth, but a good many times he had carried out examinations of a very large number of children in orphanages and other institutions in Dublin and he had seen an enormous number of perfectly normal arches. There was a great deal of difference between a normal arch and an ideal arch. In an ideal arch every cusp must fit into a very definite point, and he did not think that he had ever seen a case that was ideal from every point of view; he did not know whether anybody had, but perhaps Dr. Northcroft had. He had, however, seen an enormous number of normal arches, in which there might be a slight rotation of some teeth which would prevent the arch being ideal in every respect.

In February last, he had got into touch with a small orphanage that contained 18 children from  $4\frac{1}{2}$  to  $17\frac{1}{2}$  years of age, and he thought it would be of interest to take impressions of all those children and bring them to the present meeting for the members to see what the models of 18 unselected children were like. He thought it would be agreed that four, five or six of them had perfect arches. It was true that they had not got their third molars, but he could see no reason why there should be any malocclusion when they erupted.

It was one thing to take on Mr. Wilkinson in single combat, but when one started to take on everybody else who had made pronouncements on a certain subject one did not feel quite so confident. That, however, was what he proposed to do.

Mr. Wilkinson said in his original paper that the premolars moved distally in their crypts after the extraction of the first permanent molars, and that was the way in which he made room for the incisors. Personally he did not think that any cheek teeth moved distally, no



matter what extraction took place behind them. They could be driven distally by a force acting on them; for instance, a canine erupting and pressing on a first premolar might drive that first premolar distally if there was a gap behind the first premolar. The only evidence he had ever been able to find that teeth moved distally was that they appeared to do so, but he thought that that appearance could be interpreted in an entirely different way. It might be that all the other teeth had moved medially and had left certain teeth in their original position, and he thought that was what happened.

It was the experience, he thought, of most orthodontists that after the extraction of deciduous molars, especially in the lower jaw, the spaces did not always close. In some children they closed very rapidly but in other children they did not close at all, and he thought the reason was that children could be divided into two groups, i.e., the vigorous, robust, large-boned children, and the small-boned weaklings. In the former the teeth anterior to the spaces kept growing forward and the teeth posterior to the spaces could not grow fast enough to overtake them and close up the spaces, but in the weaklings the anterior portion of the jaw did not grow forward at the same rate and the spaces closed very rapidly.

The evidence that he wished to bring forward to show that teeth did not move distally was not very extensive or conclusive, but he thought it could be accepted as proving his case.

The first piece of evidence was from the work of Brash,<sup>1</sup> which had been brought before the Society many years ago, on the growth of alveolar bone. Brash showed that teeth moved forwards and produced no evidence at any time that they moved backwards. In his illustration the white bone could be seen deposited at the back of the socket and the red bone, which must be the bone of absorption, at the front of the socket.

The next piece of evidence (Fig. 1) was the change in relationship of the cheek teeth to the rugæ of the palate. The rugæ, as was well known, were an individual characteristic, like finger prints. The drawings shown were of the upper models of the same boy from 4½ to 16 years of age, and he had drawn a line across the distal surfaces of the second deciduous molars. A peculiar triangular piece of rugæ would be seen in each case. In the child at 4½ years of age it was well in advance of the cross line, whereas in the last drawing it was well behind it, showing that the teeth had moved forward in relation to the rugæ. Some people might say that it was the rugæ that had gone back and not the teeth that had moved forward. He had written to Professor Brash on that point, and Professor Brash had sent him the skull of one of the Madder fed pigs. In the pig there were bony rugæ as well as mucous membrane rugæ, and it was evident on the bony rugæ that white bone was deposited on the front of each ridge, showing that not only were the teeth moving forward but the rugæ were moving forward also, so that the teeth must be moving forward at a greater rate than the rugæ.

The third piece of evidence was the greater difficulty of moving teeth distally with an orthodontic appliance than moving them medially. He always found it exceedingly difficult to move teeth distally with an orthodontic appliance.

The fourth piece of evidence was the direction of the apical third of the root of a lower second premolar in a case where the deciduous molars and first permanent molars had been removed. In one such case the child had had all her deciduous molars removed, on account of caries, at 6 years of age, while she was in India. When she was 11 she was brought to England and taken to see a dental surgeon in London, who advised the removal of the four first permanent molars, because there was not sufficient room for the premolars and canines.

<sup>1</sup> Brash, J. C. "Growth of Alveolar Bone and its Relation to the Movements of the Teeth, including Eruption." *Trans., B.S.S.O.* Plate IV, page 96, 1926.

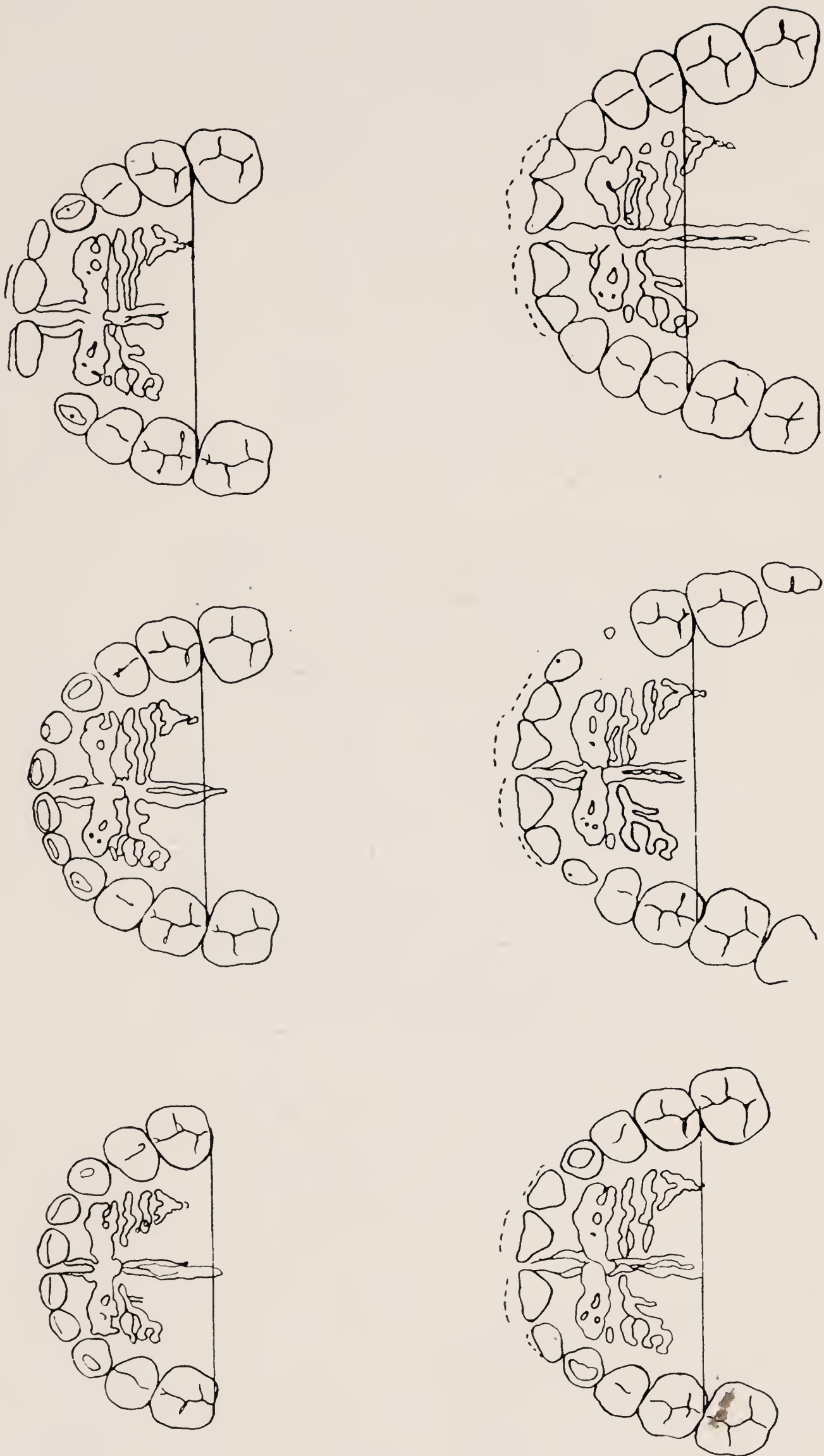


Fig. 1.



and she was given two vulcanite bite plates to keep the bite open. The child was then taken to Ireland and was brought to see him. It did not appear to him to be a case in which the bite would close, although she had only incisors at the time when he saw her, and he advised that the bite plates should be left out, as he saw her each holiday and could have the bite plates replaced if the bite showed any inclination to close. It did not do so. In due course the child erupted her upper premolars, her upper second molars and canines, her lower second molars and canines and her lower first premolars. The next time he saw her she showed a tip of one second premolar in contact with the second molar. (Fig. 2.)

In the upper jaw there was a considerable amount of rotation of the premolars, but there was not a large gap. In the lower jaw the tip of the second premolar could be seen coming out next to the second molar. The second molars were very tilted, though the child did not have her first permanent molars extracted until she was 11 years of age.

Owing to the large gap between the first and second premolars, which was practically the width of the first molar, he had radiographs taken of the child's mouth. On the the left side (not reproduced) the



Fig. 2.

radiograph showed the tilting of the lower molar, the second premolar impacted against the second molar, and the third molar impacted on the other side. The first premolar could be seen in contact with the canine and parallel to it.

The radiograph of the right side (Fig. 3) showed the teeth impacted but not as badly as on the other side. It would be noticed that the root of the second premolar was leaning forwards. It was known that the roots of premolars tended to run distally, but in this case the root ran medially, and he believed that what had happened was this: the crown had lost the support of its deciduous root, and the only means by which a crown could come forward in the bone was by the deciduous tooth coming forwards, because bone had no contact with the enamel, and the root, which was in a semi-calcified state as it came forward, had bent in the way shown in the illustration. He did not think that explanation was far-fetched, and he would give another example to show why he did not think so.



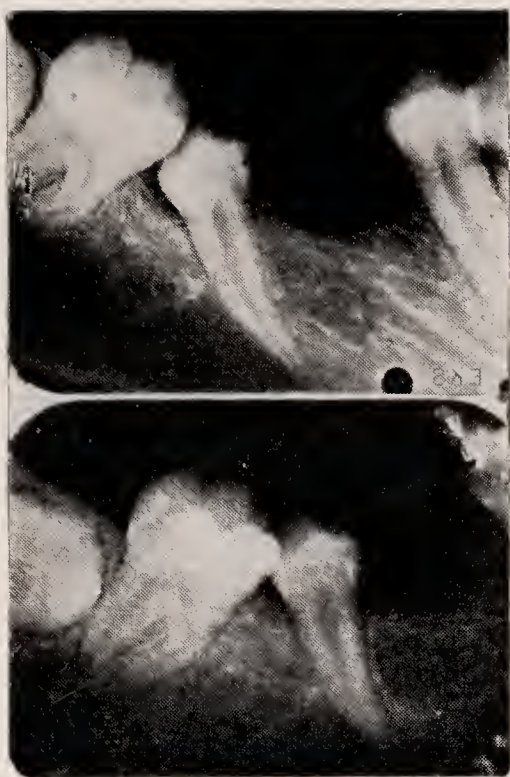


Fig. 3.

At the First International Orthodontic Congress in New York, Leroy Johnston<sup>2</sup> read a paper on the moving of teeth in monkeys by orthodontic appliances and showed that the appliance used acted on the tooth and really tilted it, so that the tooth rotated round some point along its root and not round the apex, and the crown went in one direction and the apex of the root in the opposite direction. In each of the illustrations there was a little curl at the end of the root where movement had taken place before complete calcification.



Fig. 4.

The case shown in Fig. 4 was that of a boy who had had an upper first premolar on one side removed. The upper incisors were lingual to the lower incisors. The lower first molar also had been lost. The direction of the root of the lower second premolar would be noticed. On this side the case was in every way identical with the previous one that he had shown. Fig 5 showed the radiograph of the case. The root had not developed much, but it was beginning to have a slight twist medially. On the right side the first molar

<sup>2</sup> Johnson, A. Le Roy, Appleton, J. L. Jr., Rittershofer, L. S. "Tissue Changes Involved in Tooth Movement." *Trans. First International Orthodontic Congress*, 1926, page 263, Fig. 6.

had not been removed but the deciduous molars had been extracted. Not only had the lower incisors a tendency to grow forward, but they were kept forward by the upper incisors biting behind them. The lower second premolar had been left behind. The radiograph of this side showed a distinct forward tilt of the developing root of the second premolar.

Why was it that this condition occurred almost exclusively in the case of the lower second premolars? It did not occur in the case of first premolars and it very rarely occurred in the case of upper premolars. It looked as if there were a fore and a hind section of teeth. In comparative anatomy, there was something of a similar nature in the bear and in the wart-hog, where the first premolar was close up to the canines and incisors leaving a large diastema between it and the second premolar. In most animals the premolars were in the hind section and the diastema was between the first premolar and the canine.

He thought that there was a great difference in the growth of the two jaws, and he proposed to show some radiographs taken from Symmington and Rankin's Atlas of Skiagrams<sup>3</sup> on the development of the teeth, which he thought gave one some help in understanding the subject.

The illustration (not reproduced, see footnote) showed a radiograph of a child of about 7 years of age. The one great difference in the



Fig. 5.

two jaws was that there was an antrum in the upper jaw and there was not one in the lower jaw. The room for the upper molars was practically all made by the teeth coming forwards, downwards and outwards, whereas in the lower jaw, the room was obtained by the teeth coming forwards, upwards and outwards and in addition by absorption of bone along the anterior border of the ascending ramus and the deposition of bone on the posterior border. If there were a greater forward movement of the upper teeth than of the lower teeth, it was compensated by growth at the condyle, which drove the lower jaw forward *en masse*. The distance between the floor of the antrum and the alveolar margin in the upper jaw was considerably less than the distance between the alveolar margin and the lower border of the inferior dental canal, and in all cases, as far as any radiographs that he had seen were concerned, the lower second premolar was at a lower level than any of the other teeth. It would seem, where deciduous molars were prematurely extracted in the upper jaw, that it was difficult for the premolars to get out of the forward stream of bone growth; whereas where similar extractions had taken place in the lower jaw the second premolar was so low down and erupts last that it would be left behind.

Symmington and Rankin<sup>4</sup> (not reproduced, see footnote) also showed the radiographs of a child of about 10 years of age. It would be

<sup>3</sup> Symmington, J., and Rankin, J. C. "An Atlas of Skiagrams." 1908. Fig. 1, page 27.

<sup>4</sup> H. Symmington, J. and Rankin, J. C. "An Atlas of Skiagrams." 1908. Fig. 1, page 39.



seen that the lower second premolar was much later in its eruption than the other premolars. If a deciduous tooth were taken out there was no connection between the enamel and the bone and the only forward movement of the lower second premolar that could take place was by the root coming forward, and that was why the tooth was tilted over, the crown backwards and the root forwards. It would be noticed that there was a wedge of bone between the premolar and the molar, so if the molar were taken out the premolar would not fall back into the socket.

On page 35 Plate IX Fig. 2, Symington and Rankin illustrate a case of a child (Fig. 6) who lost the lower second deciduous molar, and it would be seen that there was no wedge of bone but the second premolar was in contact with the molar. There was no reason to suppose that the premolar had gone back (there was nothing to drive it back, when the tendency was for it to come forward), so it must be that the molar had come forward.

He had tried to show diagrammatically (not reproduced) what he thought happened in these cases. The top figure was similar to the radiographs of Symington's that he had shown, in the middle figure the deciduous molars and first permanent molars had been removed and in the bottom figure he showed the migration following those extractions.

These cases were quite common. He had seen seven of them since last August. He had never looked out for them before, but when one started looking out for things one found them.



Fig. 6.

He thought all the members were indebted to Mr. Wilkinson. He himself had obtained a great deal of information from the work which Mr. Wilkinson had made him do, and he thought Mr. Wilkinson had shown that the early extraction gave a very much better result than the late extraction.

With regard to the impaction of third molars, if he were a child he would rather have his second molars out than his first molars.

In *Nature*, a paper by Professor Harris<sup>5</sup> of Cambridge had been published which he thought was of interest and in which it was shown that lines of arrested growth could be seen in radiographs. (Not reproduced, see footnote.) In a book that he had written, Professor Harris<sup>6</sup> had been able to show in the long bones a whole

<sup>5</sup> Harris, H. A. "Growth of the Mandible in the Pig." *Nature*, Vol. 144, page 552, Sept. 23, 1939.

<sup>6</sup> Harris, H. A. "Bone Growth in Health and Disease." 1933.



series of lines of arrested growth occurring at different periods of illnesses, which could be traced by the ridges corresponding to them. In the paper in *Nature* Professor Harris showed lines of arrested growth along the posterior border of the ascending ramus and also the condyle of a starveling pig. His radiograph showed the line of arrested growth which went right up to the condyle. It was a confirmation of Brash's work.

In his paper Professor Harris made the following comments: "The radiograph of the mandible also shows the danger, in the animal or person who is not fully grown, of making a forecast as to whether an unerupted wisdom tooth (third molar) will or will not erupt satisfactorily at a later date. Until the growth of the mandible ceases at 21 to 25 years of age in the human, female or male, there is little justification for interference with the third molar which gives rise to no active symptoms. On the other hand, the continued refinement of the face and reduction in the size of the mandible in passing from ancient man to modern man suggests that the wisdom tooth in the future will give rise to more anomalies than in the past." He thought that extract from Professor Harris's paper should give Mr. Wilkinson food for thought.

One other matter which he thought might interest Mr. Wilkinson was the power of chewing of the first molar compared with that of the second molar. He had examined with a dynamometer the pressure exerted on the first molars and the second molars, and he found that whereas children could bite 200 lbs. with their first molars they could only bite 110 lbs. with their second molars or their second premolars. The roots come to a point in the second molar, but they were well spread out in the first molar.

**Mr. Harold Chapman** said that Dr. Friel had dealt with a number of points to which he himself had intended to refer, one of them being Mr. Wilkinson's suggestion that orthodontists might soon be out of work. He found the trend of thought in dental matters at the present time bewildering. It appeared that a good many practitioners would soon be out of work. A few months ago an article in the *British Dental Journal* had extolled the use of tablets to render unhealthy mouths of children free from all trouble, yet a supine Government would not even make the ingredients available and so release a number of practitioners for other war efforts. Later another article had advocated the sucking of pastilles to control caries in adults, and still later in a letter to *The Times*, Professor Mellanby had said that chalk in bread would benefit the teeth. A little while ago an eminent friend of his in the dental profession had told him that if he had control of the child he could prevent any malocclusion whatever taking place, and now Mr. Wilkinson said that he could obviate malocclusion and caries. It therefore seemed that the period of reconstruction would be lively; That reconstruction could be begun now, but he had not heard of any action being taken in that direction. Why was there so much indifference? Let us therefore turn to Mr. Wilkinson's paper.

He had to admit that he had never practised the removal of the first permanent molars as part of his orthodontic creed, though from time to time he advised their removal for reasons other than those given by Mr. Wilkinson. He had been more fortunate than Mr. Wilkinson in that he had seen several individuals with complete dentitions which were not overcrowded. He had shown two cases in connection with bottle feeding at the last meeting of the Society, one of those cases being that of a member of the Society, and only the previous day he had seen a girl aged 22 who had very good jaws with no sign of overcrowding; she had postnormal occlusion, and two permanent molars were erupting and two were unerupted but there was space for them. Therefore there were cases which did not show overcrowding, and he did not think that they were rare.

He had brought with him some models given to him by Mrs. Lindsay of an adult with a beautiful set of teeth, complete and in excellent condition, and he could produce innumerable cases of children with normal occlusion which he believed would develop into such cases as he had just described, i.e., cases with good arches, with all the teeth in alignment, and with good occlusion.

That brought him to an important point, namely, that an individual had either good arches, large enough to contain the teeth in alignment, or small arches in which there was not sufficient room. Would Mr. Wilkinson treat those two types of cases in the same way? Would he extract the four first permanent molars from the children who had good arches and would he also extract them from the children who had small arches? Surely to obtain the same effect he would have to remove more teeth in the latter cases than in the former. It had never been his own practice to advise the extraction of teeth in the former, but in the latter he always advised extraction, unless the degree of smallness was so slight that the irregularity did not call for treatment. As one walked in the streets of London did not one see numerous individuals with what one would regard as excellent arches and an excellent set of teeth? It was stated in the paper that 90 per cent of children had malocclusion, yet Mr. Pilbeam, in a letter to the *British Dental Journal* (1st May, 1942), suggested that approximately 5 per cent was the true index of malocclusion in school children. That was a marked difference.

The early extraction of the first permanent molars might prevent caries, but he had not been convinced so far that it cured malocclusion. It was true that he had not yet seen the models exhibited by Mr. Wilkinson. Mr. Wilkinson excluded from his treatment cases of postnormal and prenatal occlusion. Speaking offhand, he would say that 75 per cent of the cases which he saw in private practice were of postnormal occlusion, so a very large percentage of his patients would be excluded from the treatment advocated in the paper. In hospital practice the percentage was not perhaps quite so high, but he thought it was 50 per cent. One also saw more cases in which there had been early loss of the deciduous molars, which were another type of case in which Mr. Wilkinson did not advocate the removal of the first permanent molars. Therefore, if only 5 per cent of school children had malocclusion, as stated by Mr. Pilbeam, something under 3 per cent would be the proportion of children to be treated by Mr. Wilkinson's method.

Overcrowding might be undesirable, but the results of extraction might also be undesirable. Dr. Friel had pointed out some of those, and all the members would know of others. It was not all to the good to lose one's first permanent molars.

With reference to a few particular statements in the paper, he shared Dr. Friel's view that the third molar problem might be dealt with when it arose. Were all children to be dealt with on the assumption that something might happen? Were all people to have their appendices taken out for fear of appendicitis? He had seen mouths with very irregular teeth which were as clean as one could wish to see and with gums as healthy as one could desire. It was stated that third molars might wreck the best obtainable result when they erupted. It was very common to blame the third molars for relapse, but he thought that relapse would occur whether the third molars were removed or not; he did not think they had anything to do with it at all. He would require further evidence than had been produced that afternoon on curing incisal irregularity by removal of the first permanent molars.

He was one of those incredulous people to whom Mr. Wilkinson referred, but he was incredulous only because the evidence was insufficient. He was quite open to be convinced, and it would be a great blessing to the whole population if Mr. Wilkinson's contentions were really sound.



It was stated that the removal of the first permanent molar was followed by a quite astonishing amount of arch expansion. He would like to have further details about that, because he had believed for some time that the loss of a lower tooth, including a permanent molar, was followed by contraction of the arch and not expansion. However, he was inclined to believe that, if the first permanent molar was removed and the second lower premolars drifted distally (Dr. Friel said the other teeth moved forward, but the effect was the same), the arch breadth across those teeth would be increased. Again, when the teeth moved medially there was a decreased arch width. For example, when the second deciduous molars were lost the first permanent molars moved forward on converging lines and therefore the arch width was less. But he did not think those facts explained the expansion which was described in the paper as "quite astonishing."

He would like Mr. Wilkinson to say whether, if postnormal cases were untreated but the first permanent molars were removed, the children would still be caries free. Must the postnormality be corrected in order to give freedom from caries?

With regard to overbite, it was stated in the paper that it was the simplest condition to treat and never relapsed after it had been properly treated. His own experience was diametrically opposed to that. He thought it was a most difficult condition to treat. He could obtain a temporary correction easily, but whether it would be permanent or not he could not tell. He had seen cases in which the bite opened without any treatment whatsoever. Therefore he suspected that the cases in which the bite opened were the ones in which it would have opened whether the children had worn a bite plate or not. Breitner appeared to be of the opinion that to open the bite by orthodontic treatment it was necessary to lengthen the muscles, and that it was not believed possible to do. Therefore there seemed to be some scientific evidence for the belief that it was not easy to open the bite.

He agreed entirely with Mr. Wilkinson's views as to the best service that orthodontists could render to their patients, but he was unable to agree with him as to the best method of achieving that, and he did not believe that decrowding was essential in every case.

He felt that much of the paper did not deal with the main issue which was under discussion on the present occasion, i.e., the benefit of early extraction of the first permanent molars. No speaker could put his case better than Mr. Wilkinson, but members must make their own deductions on the question dealt with in the paper and not base their decisions on *ex parte* statements but on the evidence of the treated cases. To be of real value, the evidence must show the condition before anything had been done, as well as after treatment.

He very much appreciated the visit paid by Mr. Wilkinson in order to expound the results of his beliefs.

**Mr. F. Bocquet Bull** said that the subject with which Mr. Wilkinson's paper dealt had been under discussion for the last eighty to one hundred years and he supposed it would be debated for the next hundred years; he hoped it would be, because he thought it formed a very good subject for discussion. Unfortunately he had not had an opportunity of seeing a copy of the paper before the meeting, and he had gathered from the title, "The Early Extraction of the First Permanent Molars as the Best Method of Preserving the Dentition as a Whole," that reference would be made chiefly to the question of infection. The early caries of the first permanent molars possibly spread infection, and it was from that point of view that he had made a few notes for his remarks on the present occasion.

He wished to speak in defence of the first permanent molars. It was a very serious thing to cut down the grinding masticatory surface of the teeth by  $33\frac{1}{3}$  per cent. That was the minimum decrease which would be brought about; it might be more, according to the size of



the wisdom teeth which erupted, which were sometimes poorly developed teeth.

He had never yet found any scientific reason why the six-year-old molar tooth was so much abused by various authorities as being especially prone to caries. By "scientific reason" he meant a reason connected with development or calcification, or anything of that kind. He had recently taken the opportunity of speaking to Professor Sprawson on the subject. Professor Sprawson had investigated it some time ago and wrote down for him at once fourteen reasons for the occurrence of caries in the first permanent molars, his opinion corroborating his own view that it had nothing to do with the tooth structure itself but was due to causes which could and should be guarded against. One of the reasons given by Professor Sprawson was that the first permanent molar began to calcify at birth; therefore the crown formation period was possibly endangered if the child was hand fed or enhanced if the child was breast or otherwise ideally fed. Probably the most important of the fourteen reasons was that the tooth had a large crown and therefore there were more extensive fissures for food lodgment, especially if five cusps were present, as usual. Other important reasons given by Professor Sprawson was that no tooth was lost to make room for the first permanent molar and the parents therefore took it for a deciduous tooth and did not take care of it; that it was the last tooth and not so easily brushed as more anterior teeth; that the tongue was not so readily available at an early age to brush over it; that it was far back and therefore not so easily seen by parents, and that the child was not impressed at so early an age with the need for scrupulous dental cleanliness. If those matters were attended to, as they could be quite easily, he thought there would not be so much early caries in the first permanent molars.

He had come across a discussion on diseases of children's teeth which was held in 1910 and at which Dr. Cunningham spoke as follows:

"If the six-year molars must go, they ought to go all at once; and if there was a rotten one below and a healthy one above the latter should go too. But they were going to do away with the forceps for the future. Mr. Gant pledged himself that, provided he got all the six-year molars in the Cambridge elementary schools between 6 and 8 years, they were going to save them all, and the forceps would not be wanted while the children were of school age. If that could be brought to pass at Cambridge, there was no reason why it should not be done in the whole of the Kingdom. Therefore he would ask them to join with them in their league for saving the molars of the British race. The most prevalent disease on earth was absolutely preventable within a degree. He believed it was possible to build up the British race with molars. At present the British race had not got them. Human nature was weak; it was necessary to get up a scare and talk about the white plague and tuberculosis. When Mr. Sedley Taylor—who provided the money for the work amongst school children at Cambridge—and the municipality of Cambridge had saved the molars of their children, they had given them not only healthy masticatory organs through life but had saved them from one of the most prevalent channels for the communication of tuberculosis."

Mr. Wilkinson stated that by extracting the six-year-old molar teeth systematically he had rendered his patients' mouths 70 per cent caries-free. That might be so, but, on the other hand, he did not say what means he had of knowing that they would not have been caries-free had he not extracted those teeth. During the last 25 years he personally had seen a number of people of advanced age with all their molars present and in quite good condition and with their mouths, if not absolutely free from caries, with very little caries, and he could not see why such people should be denied the use of a third of the normal grinding capacity of their teeth throughout life.

He had also discussed the question with a parodontist, who wrote



the following letter to him a few days ago : " I was very interested to hear your views concerning the perennial controversy of the symmetrical extraction of six-year-old molars. There is a further point against extraction of these teeth and that is in connection with parodontal disease. Where removal of these teeth results in even slight tilting of the second molars, the local if not general parodontal health is jeopardised. This is caused principally by loss of contact, and by the teeth being placed in a position so that they do not occlude axially. I think you will find that this is the opinion of the majority of the parodontal authorities."

No one could be more willing than he was to extract a tooth whose retention was detrimental to the general health or the proper formation of the arches or which was beyond saving, but he thought that each case must be decided on its own merits. To his mind it was not only impossible but wrong to attempt to lay down a dogmatic ruling for the teeth of the nation as a whole such as was propounded by Mr. Wilkinson in his paper.

**Miss L. M. Clinch** said she would like to thank Mr. Wilkinson for his paper. She had certainly learned a great deal in trying to find out how far his claims were justified.

With regard to malrelationship of the arches, she thought it was a doubtful policy to extract lower molars in a case that had been treated for Angle Class II or upper molars in an Angle Class III case.

Mr. Wilkinson said that he had had 15 cases under observation in which he had extracted the first permanent molars at 8 years of age and for six years afterwards all those cases had been caries-free, but she would point out that for four or five of those years the premolars and second permanent molars would only be beginning to erupt, so that there would not be any teeth to be attacked by caries except the incisors and canines, and they were not prone to caries in any event. Therefore there were only two years left in which caries could develop.

She could not agree with Mr. Wilkinson that 99 per cent of Anglo-Saxons had overcrowding of the teeth. When she read that statement in the paper she remembered that when she was doing her post-graduate course in orthodontics she had to take plaster impressions of 46 boys from an orphanage in Dublin, to enable her to see more children who had not come to hospital for orthodontic treatment or for fillings or extractions. Up to that time all the children she had seen had come to hospital for treatment, and it had been a revelation to her to see so many broad arches and healthy mouths.

In order to see whether her memory was at fault she had decided to examine 100 London County Council school children, and it might be of interest if she gave briefly the result of her examination of the 55 cases that she had already examined. Of those 55 children, 19 had very good occlusion, by which she did not mean ideal occlusion but good functional occlusion; 7 were Angle Class I, 4 were Angle Class II, and 1 was Angle Class III. Twelve of the children had had either upper or lower first permanent molars extracted, and 5 of those had a large space between the first and second premolars. Six of the children had premolar space lost owing to early extraction of deciduous teeth, and one of those was a pseudo Angle Class III. One had had upper premolars extracted but had otherwise good occlusion, and one had upper lateral incisors absent. Therefore, in her opinion, 34 per cent of the cases needed neither extractions nor orthodontic treatment, and she did not see any reason to think that they ever would; and 23 per cent were cases in which even Mr. Wilkinson did not advocate early extractions, i.e., Class II and Class III.

With regard to the cases to which Dr. Friel had referred, in which there was a large space between the premolars, admittedly that would not occur if the deciduous molars had not been extracted as well as the



first permanent molars, but it was rather difficult to say, when a child was 8 years of age, whether the deciduous molars were going to last until the premolars had erupted, and the space between the premolars was not a transitory phase; it was not a space that closed.

She illustrated models of a girl of 21 years of age whose lower right first permanent molar had been extracted when she was 9 years old. The seven and five were in contact, and there was still a large space between the premolars. The condition was so serious that she thought it should be guarded against.

It was a fallacy to believe that the early extraction of the sixes eased all possible crowding of the incisors and canines.

In a further case shown, although the lower first permanent molars and one upper had been extracted when the child was 8 years of age, the upper canines were crowded out of the arch buccally, and the laterals lingual to them at 13 years. That incidentally brought in the question of caries. On the side where the upper first permanent molar was extracted the entire distal surface of the second permanent molar had decayed away. There was as much crowding on the right side, where the six was extracted, as there was on the left side, where it was not extracted. She thought it would have been much more useful to extract the first premolars in this case, which was a common type.

If impaction of the third permanent molars was feared she preferred to extract the second molars. X-rays taken at 15 or 16 years of age would give a good indication of the possibility of future impaction. Considering the amount of growth which normally occurred between 8 years of age and the eruption of the third molars, it seemed to her very difficult, if not impossible, to predict with any accuracy what the condition in the third molar region would become, even if the third molar could be shown at all in an X-ray at 8 or 9 years of age.

Mr. Wilkinson claimed that the extraction of the first permanent molars was followed by considerable widening of both arches, and Mr. Chapman had expressed his disbelief in that. Even if the widening occurred, it seemed to her that it was not due to the extractions but merely to the normal growth which one would expect to occur after 8 years of age, as shown in the M.R.C. report.

She had examined 100 serial models of her orthodontic cases and had found that 56 of them had bad malrelationship of the arches, and they therefore belonged to a type of cases which Mr. Wilkinson agreed must be treated orthodontically. Therefore, even if the removal of the first permanent molars before children were 10½ years of age were practised by all the dentists in the country in the type of cases in which Mr. Wilkinson advocated it, there would still be work for some orthodontists.

With regard to close bite, she thought Mr. Wilkinson must be more fortunate than she was. Personally she looked upon close bite as the most difficult condition to correct. She thought there were two types of close bite, i.e., the congenital type and the type which either was caused by premature extraction of deciduous teeth or was simply a transitory phase which cured itself.

She thought that the only way in which congenital close bite could be corrected was to raise the bite on, if possible, the erupting first permanent molars, or, if the case was seen too late for that, on the first molars and erupting second molars. In other cases, where it was obvious that the molars could not be saved for many years, their extraction seemed advisable. She thought that if opposing molars were carious and the cases were not Class II or Class III it was probably better to extract both.

**Mr. C. F. Ballard** said that most of the points which he had intended to raise had been dealt with by previous speakers, but he



would like to say that for a year or two he had taken a mental note of parodontal conditions medial to tilted lower first, second and third permanent molars where the second premolar or the first premolar had been extracted, and he had found that those parodontal conditions did not usually occur until the person was approaching the age of 30 years. He therefore thought that Mr. Wilkinson's cases would need to be watched for several more years before he could be sure that parodontal conditions would not develop.

Mr. Wilkinson claimed that by his treatment infection in the mouth was eliminated and therefore the recurrence of caries in the second and third permanent molars was prevented. Personally he thought that it should be possible to eliminate the carious infection in the mouth by the correct filling of the first permanent molars, preferably with gold inlays.

He would like to thank Mr. Wilkinson for his paper, which had stimulated an interesting discussion and had helped to settle many points that had been in his mind for some years.

**Miss K. C. Smyth** said she wished to mention first, in connection with the expressions "ideal occlusion" and "normal occlusion" which had been used by several speakers, that in the work which she had done on the Medical Research Council, to which Mr. Wilkinson had referred, the cases had been very strictly selected on the basis of ideal occlusion. The investigation had been intended to apply only to those cases which were ideal or very nearly so. Mr. Wilkinson had said that he loathed statistics and figures, and she thought most of the members understood and shared that feeling, but, having had the very great privilege of working on several occasions with the late Dr. Young, she had become convinced that no scientific research could be accomplished without regard being paid to statistics, and that controls in such experiments were essential. It was not possible to bring forward the results of any scientific research unless it had been carried out under proper conditions and there was something definite to put before a scientific audience.

Feeling quite certain that many members would bring forward cases to illustrate the various points in connection with the effects of extraction of the first permanent molars, she had brought only one case to show. It had one point of special interest. Both first permanent molars had been extracted on one side but not on the other. The approximate ages at which the extractions had been done were known. The present age was 16½ years. The fact that no extractions had been done on one side formed a kind of control, and the two sides of the case provided a more interesting comparison than any pair of different cases, with the exception of twins. There was no difference in caries on the two sides, there being small fillings in teeth on both sides. It could be seen how far the second permanent molars, both upper and lower, had moved forward on the side where the extractions had been done. The closure of the spaces, however, was not entirely due to forward movement of the second molars; the premolars had definitely drifted distally and spaced, and the arches presented an asymmetrical appearance. She realised, of course, that those extractions had been done at a much later age than that advocated by Mr. Wilkinson.

The centre line of the lower arch had shifted to the right considerably more than the upper, which had hardly shifted at all. Of course, any deviation of centre line would be obviated in symmetrical extractions as advocated by Mr. Wilkinson, but the shifting in the case shown did not go to show that the effect of the extractions had been felt as far forward as the incisors.

The lower second molar on the side of the extractions had tilted in the usual manner, and the distal edge of the tooth only was in occlusion. It seemed probable that later on the molar might come into contact



with the premolar, and, if so, the space between them would form a food trap which it would be impossible to keep clean by ordinary methods. Her experience of small spaces between teeth was that food packing was very common and very difficult to avoid unless an unusual amount of care was taken. To obviate that danger, the space must be more than 1 mm. in width, and even then there was danger if the space was much wider at the gum margin level than between the nearest points of the two crowns. She thought there was more danger from food lodgment where small and V-shaped spaces occurred between teeth than where a mild degree of crowding existed. The result most often observed was a thickening of the gum edge and the formation of a deep pocket, and very often, at between 20 and 30 years of age (she strongly agreed with Mr. Ballard's point as to the age) caries was found below the gum margin. In the case described the age was too young for those results to have occurred, and most older patients, in whose mouths one found the conditions described, could not remember the age at which the extractions had been done.

She hoped to follow up the case that she had shown. She was at present in the position of running a general practice with a considerable number of orthodontic patients in it, and that had certain advantages from the point of view of following up cases and seeing the results of other people's orthodontic treatment. In a specialised practice one was apt to lose sight of one's patients too soon.

**Mr. H. G. Watkin** said his interest in Mr. Wilkinson's paper was such that it had brought him to London after about two and a half years' absence.

Mr. Wilkinson lived in a very healthy and wealthy district, and his patients were of the better class that had better dentitions. He illustrated with slides a few cases that he thought might be of interest.

The first showed the models of a patient of 38 years of age who had lost the two centrals and laterals, and, without any orthodontic treatment whatsoever, the whole of the other teeth moved forward until there was only a slight space in the front. He thought that teeth normally moved forward if they were not interfered with at all.

He had recently had a case in which the two upper first permanent molars had been filled about a fortnight previously, and the lower first permanent molars had been extracted two years ago. Of course, the upper molars ought to have been extracted at the same time as the lower molars, and it was waste of time to fill them.

A further case illustrated showed when to extract the first permanent molars. The condition was one that existed between 7 and 10 years of age where the first permanent molars were in good occlusion and the sevens had their roots undeveloped. The deciduous cheek teeth should be preserved. He wished to emphasise that it was most important to preserve something to keep open the bite. The first permanent molars were extracted and the posterior teeth moved forward into the rarefied bone where the cheek teeth had been taken out; they moved forward perfectly with no tilting. The next models were those of a woman now aged 40. She had had her sixes removed at the age of 9 years. If they had not been extracted she would have had superior protrusion.

He illustrated an unfavourable condition for the extraction of the sixes when the deciduous cheek teeth were missing and the age was between 10 and 12 years. The sevens were erupted but not in occlusion. If the sixes were extracted the natural forward motion of the sevens would cause them to tilt. It was wrong therefore under those conditions to remove the sixes at the age of 10 to 12 years. If they were carious, and it was considered desirable to remove them on that account, they should be preserved a little longer, with root treatment if necessary and cement fillings, until the fours and fives were through and there was something to keep the bite open. The sixes should be kept in



until 13 or 14 years of age, when the roots of the sevens were complete and straight up.

He showed a case where the cheek teeth had been preserved and the sixes extracted at the age of 12. Now, at the age of 17, there was only little tilting. A similar case was shown when the extractions had been done at the age of 16. Here too tilting was only slight. He did not think that sufficient stress had been laid on the size and influence of the tongue. Dr. Friel had referred to the pressure exerted by the muscles, and the tongue was a typical muscle. In cases where there was a powerful tongue there were very often good wide arches, because there was something in the mouth to hold the teeth out, whereas in cases where the tongue was weak the arches were often narrow and certain extractions were necessary to straighten the teeth.

In some cases the extraction of the sixes did a great deal of good, but each case must be taken on its merits and there should be due examination and consideration of the case before the sixes were removed.

**Mr. R. Cutler** said he hoped that the excellent attendance at the meeting would be some reward to Mr. Wilkinson for the trouble he had taken in preparing his paper and coming to put his views before the members. Mr. Wilkinson had sincerity and a very wide knowledge and his contentions were supported by a large number of models, so that he was in a good position to put them forward with some confidence.

The trouble about making generalisations was that the moment one made them the specialists objected; the generalisations were alleged to be specious and an attempt was made to show how dangerous generalisations were, but it was necessary to have them. If orthodontics were to be carried out only by specialists generalisations were not required, but if the vast mass of the members of the dental profession were to conduct orthodontic treatment certain generalisations, the truth of which had been proved, would have eventually to be adopted.

He was greatly interested in Mr. Wilkinson's reference to Anglo-Saxon people, and he knew exactly what was in Mr. Wilkinson's mind in that respect, because before the war he had seen a large number of American children at one time or another and had always been surprised at the size of their jaws as compared with the puny undeveloped jaws which most of the young people in this country, both rich and poor, possessed. He could quite understand that in America much more ambitious orthodontic procedures were possible, not involving extractions, because the potentialities of bone growth in the young American who was only one or two generations separated from Poles or other Central European types were much greater than in the young people of this country. When Mr. Wilkinson referred to Anglo-Saxons he doubtless meant the vast mass of the inbred people whom orthodontists in this country were called upon to treat.

He would have liked Mr. Wilkinson to restrict the extraction of the first permanent molars to Class I cases or to those which needed orthodontic treatment rather than to apply it to what he would describe as self-stabilising cases. Many orthodontic cases were not self-stabilising, and serious difficulties might be encountered if, after a certain amount of treatment, one extracted the six-year molars, which were very useful for orthodontic treatment of one sort or another. The ideal type of case for the extraction of the first permanent molars would be a Class I case with an instanding central inlocked by the bite, with crowding developing in the canine region and the canines just about to erupt. He thought it would be generally agreed that a little simple orthodontic treatment to push the central over the bite, followed by the immediate extraction of the six-year molars, would produce a result that was perfect in every possible way. But he must admit that in a severe Class II case, which might need many years' preliminary treatment,



the removal of the six-year molars before the treatment was finished might be attended with very grave disasters.

One pair of models which he had brought to the meeting and which he thought would please Mr. Wilkinson were those of a patient who had had all the six-year molars removed a year before he saw her and the parents said that her appearance was greatly improved. He thought the general effect was very good. Another pair of models he had brought were those of a case of his own, Class II, Division 2, in which he secured very good results, with a normal occlusion, and now the case had relapsed in an extraordinary way. The boy was 16 and the twelve-year molars were just like wisdom teeth. There was a flap of gum over the distal half of the teeth. He believed that if, when he had treated that case and got normal occlusion, he had extracted the six-year molars the further progress of the case would have been better.

**Mr. J. S. Butchart** said that he had had his sixes removed at the age of 8 or 9 years and had been caries-free until he was 23, when he had had one very small filling done. He had had caries afterwards due to conditions in the last war.

**Mr. Wilkinson**, in reply, said he had been very interested in the discussion. Some very good points and some very bad points had been made. The only two speakers whose remarks had really been relevant were Mr. Watkin and Mr. Cutler.

The whole secret of the treatment that he advocated was the preservation of the temporary dentition; nothing could be done without that. If a temporary tooth was lost the sixes should not be extracted.

Miss Clinch had shown a case in which the seven and five were in contact and there was a large space between the premolars. That was due, in his opinion, to the loss of the second temporary molar. One model that he had brought to the meeting was that of a child who had lost her second temporary molars and the decay in the sixes was so bad that, as there was no hope of keeping them permanently with any degree of satisfaction to the patient or to himself, he had extracted them, and the result was not really bad.

Mr. Chapman, for whom he had the greatest respect and whose writings he always read with great interest, said that it was not uncommon to see an Anglo-Saxon with 32 teeth and without overcrowding. His own experience was quite different from that of Mr. Chapman. Not 1 per cent of his adult patients with 32 teeth had not overcrowded mouths. It was the Medical Research Council that said that 90 per cent of children had overcrowded mouths, and they had examined thousands of children. Someone had stated the other day that only 4 to 5 per cent of children had overcrowded mouths. Their standards might be different, but one of them must be definitely wrong.

He had referred in the paper to the contra-indications for early extraction of the first permanent molars, and he had said there: "They are marked meso- or disto-occlusion in which cases the deformity must be corrected and stabilised before the extractions are done." Some time ago he had done a Baker anchorage in a Class II and, after waiting for a year, he had then taken out the sixes, and the whole thing had relapsed.

He had brought with him the models of two brothers. The elder boy had been brought to him a year ago, at the age of 14 or 15, and he had then about 14 cavities in his four first permanent molars. He had removed those teeth at once. The surfaces of the contiguous teeth were eroded, so he cleaned them, and a year later one of those teeth had to be filled. In the case of the other boy, who was 13 years of age, he extracted the sixes, because there were 12 cavities in them.

His chief objects were, first, to reduce irregularity and, secondly, to produce caries-free patients. He felt that he could not stress too often or too much the importance of preserving the temporary dentition.

When he had said a few years ago that 90 per cent of orthodontists in this country would be out of work if they would take out their patients' first permanent molars he had not meant that to be taken literally, but he wanted to stir people up to see the importance of that treatment. It was no use suggesting in a quiet temperate way that a certain thing might be an advantage ; it was necessary to be somewhat violent in putting it forward.

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# Labour and Dental Deformities

By SIR FRANK COLYER, K.B.E., LL.D., F.R.C.S., L.D.S.

THE relation of difficult labour to dental deformities has received but little attention from medical and dental writers. In 1906 and 1907 papers were published by L. S. Chilcot,<sup>1</sup> M. Cryer,<sup>2</sup> and R. H. Ivy<sup>3</sup> in which cases of dental deformities were described and the suggestion put forward that the abnormalities might possibly be traced to the effects of difficult labour. These papers interested me because, about that time, two children came under observation with dental deformities which it seemed possible were due to difficult labour. Owing, however, to other work I gave but little attention to the subject until a small boy was seen with a curious asymmetry of the dental arches associated with a marked deformity of the head. The father, on being questioned, volunteered the statement that the boy was born with the deformity and the doctor had said that "it would come quite right." After seeing this case I decided to make an inquiry into the relation of difficult labour to dental deformities and with the object of obtaining clinical material sought the aid of the Matron of the York Road Lying-in Hospital who very kindly furnished me with details of eighty-two cases of various types of presentation. The mothers were written to, but only a few of the children came for investigation, the letters in many instances were returned with the statement "Gone away." The amount of clinical material obtained was disappointing but it did afford sufficient evidence that a relationship might exist between difficult labour and certain dental deformities.

The cases most likely to show deformities are breech, face, and brow presentations, these forms are, however, rare, as will be seen from the following data given by J. B. De Lee.<sup>4</sup> "In the Chicago Maternity Center, 1932-1938 (all home service and therefore more like general practice), of 14,200 cases there were 96.13 per cent cephalic, 3.24 per cent breech, 0.28 per cent face and brow, 0.35 per cent transverse presentations." "At the Chicago Lying-in Hospital, in 35,179 births 94.95 per cent were vertex, breech occurred in 4.2 per cent, transverse in 0.45 per cent, brow in 0.068 per cent, and face in 0.33 per cent."

During the passage through the parturient canal the head of the foetus undergoes certain changes which are known by the term moulding. In this process of moulding the head is diminished in size and altered in shape. The change taken by the head depends upon the type of presentation and the position of the foetus.

In vertex presentations the long diameter of the head may lie in either the right or left oblique diameter of the pelvis with the occiput pointing either forwards or backwards. There are, therefore, four positions the head may assume. The text-books differ about the relative frequency on these positions, the figures given in "The Queen Charlotte's Text Book of Obstetrics"<sup>5</sup> of 17,813 cases of vertex presentations are as follows:—

<sup>1</sup> "Obstetrical Deformity of the Mandible." *Dental Cosmos*, Vol. 48, p. 257, 1906.

<sup>2</sup> "Some of the Factors that Modify the Human Jaw and Other Portions of the Face." *Dental Cosmos*, Vol. 48, p. 1071, 1906.

<sup>3</sup> "Some Deformities and Injuries to the Face and Jaws of the Foetus in Utero, or Incident to Labor." *University of Pennsylvania Medical Bulletin*, December, 1907.

<sup>4</sup> "The Principles and Practice of Obstetrics." By Joseph B. De Lee. Seventh Edition, 1938, p. 204.

<sup>5</sup> Fifth Edition, p. 242, 1939.



Left occiput anterior ... ..	58%
Right occiput anterior ... ..	23%
Right occiput posterior ... ..	11% approx.
Left occiput posterior ... ..	8% approx.

A summary of the disposition of the bones of the skull due to moulding in vertex presentations is given by Edgar<sup>6</sup> as follows :—

(1) “ The anterior or presenting parietal bone is the lowest presenting part, and it overlaps not only its fellow but also the frontal and occipital bones. Thus, in the two left positions of the vertex the left or posterior parietal bone is overridden by the right ; and in the two right positions the right or posterior parietal bone is overlapped by the left.”

(2) “ The half of the frontal which is posterior and toward the sacrum is overlapped by its neighbouring bones and is slightly flattened by the pressure of the promontory.”

(3) “ Again the anterior or lower parietal bone bulges more and becomes more prominent, while the posterior or higher parietal bone is forced toward the frontal and relatively flattened. Thus the halves of the skull are somewhat asymmetrical.”

(4) “ The portion of the head which is lowest and constitutes the presenting part is often forced out into a point and forms the apex of a cone, the base of which corresponds to that plane which passes through the parturient canal first.”

“ In ordinary cases deformity from moulding disappears in one or two days, and in the more pronounced cases in two or four days. In cases of contracted pelves with excessive moulding of the head, permanent deformity may result which perhaps can be positively determined only by taking a cast of the head, as measurements are misleading and unreliable.”

Skulls showing moulding are illustrated in fig. 1. The one marked (a) is from a case of left occipito-anterior, the one marked (b) from a case of right occipito-anterior.

J. B. De Lee<sup>7</sup> referring to the moulding of the foetal head remarks that “ the asymmetry of the head produced by the mechanical factors in labour disappears by the end of a week, but there often remains a permanent asymmetry of the skull.”

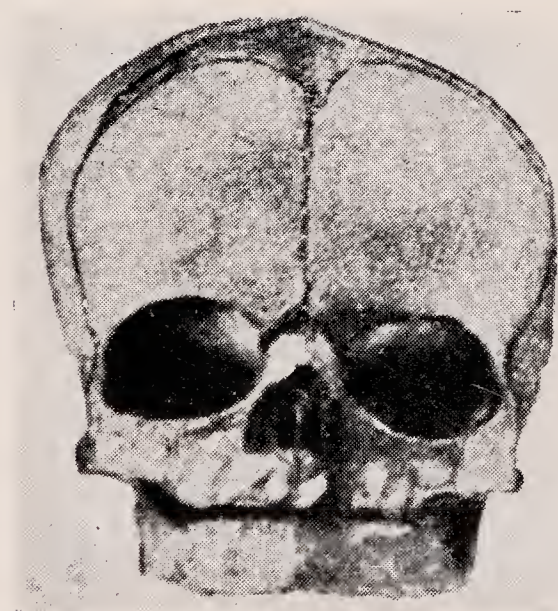


Fig. 1(a).

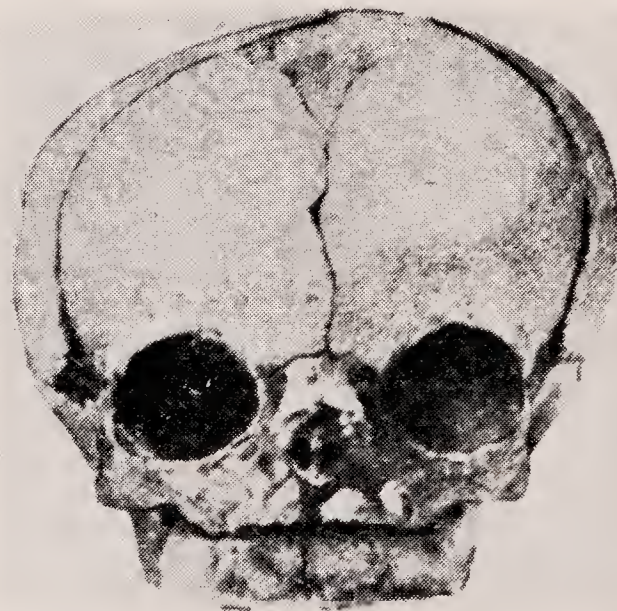


Fig. 1(b).

Fig. 1.—Skulls showing moulding. The one marked (a) from a case of left occipito-anterior ; the one marked (b) from a case of right occipito-anterior. From Edgar's “ Practice of Obstetrics,” third edition.

<sup>6</sup> “ Practice of Obstetrics.” Sixth Edition, p. 303.

<sup>7</sup> “ The Principles and Practice of Obstetrics.” Sixth Edition, 1933, p. 153.



In an interesting communication to the Royal Society of Medicine, Odontological Section (Vol. IV, p. 105), W. Rushton drew attention to facial asymmetry and referred to a paper on the subject by Richard Liebreich.<sup>8</sup> This author came to the conclusion that asymmetry of the face is a characteristic sign of the human race and is found amongst all races and has always existed. He considers that the asymmetry is the result of purely mechanical causes—namely, “the pressure of the bones of the pelvis on the head of the fœtus.”

The usual form of asymmetry is described by Rushton as follows:—“The left side of the face is flatter than the right, chiefly noticeable in the malar bones. The maxilla comes next in distortion and appears displaced to the right; the left surface being flatter and the canine fossa less marked. In a small number of cases the opposite takes place. In the dry specimen the differences are more marked than in the living, as some of the asymmetry is effaced by the skin, flesh, and fat. The most marked difference is noted in the malar bones; the right being prominent, while the left with a wider curve is deflected backwards and slightly upwards. This causes a difference in the form and position of the borders of the orbital cavities. That on the right is, practically in the same plane as the face, while the left is in a plane inclined backwards. The superior external angle on the right is more advanced than that of the left, which is also a little higher.”

Galabin<sup>9</sup> states that “A slight degree of deviation from symmetry may be observed in a fœtal head which has been removed from the uterus by Cæsarian section, or after the mother’s death, and has never undergone the process of labour.” He also remarks that “After the effect of moulding has passed off, as it generally does in a few days, or a week at the utmost, this natural asymmetry may become appreciable.”

The asymmetry of the skull follows in configuration so closely the alteration of the relations of the bones seen in moulding that



Fig. 2.—Photograph of a child with extreme asymmetry of the face.

<sup>8</sup> “L’Asymetrie de la Figure et son origine.” By Richard Liebreich. (Masson et Cie, Paris.)

<sup>9</sup> “A Manual of Midwifery.” Third Edition, p. 87, 188.



it seems reasonable to assume that the two conditions are related and that the asymmetry is in the main acquired at the time of parturition rather than during the growth of the foetus.

In each of the three cases of vertex presentation quoted below there was a history of difficult labour, the position was the left occipito-anterior. There was a marked degree of flattening of the left side of the face and in two of the cases the asymmetry of the dental arches was marked.

The photograph of a young boy reproduced in fig. 2 shows flattening of the left side of the face amounting almost to a deformity. There was also a definite squeezing outwards of the left occipital region. In this case there was considerable delay in labour but forceps were not used. The models, fig. 3, show marked asymmetry of the dental arches corresponding to the moulding of the bones.



Fig. 3.

Fig. 3.—Models of the teeth of the child shown in Fig. 2.

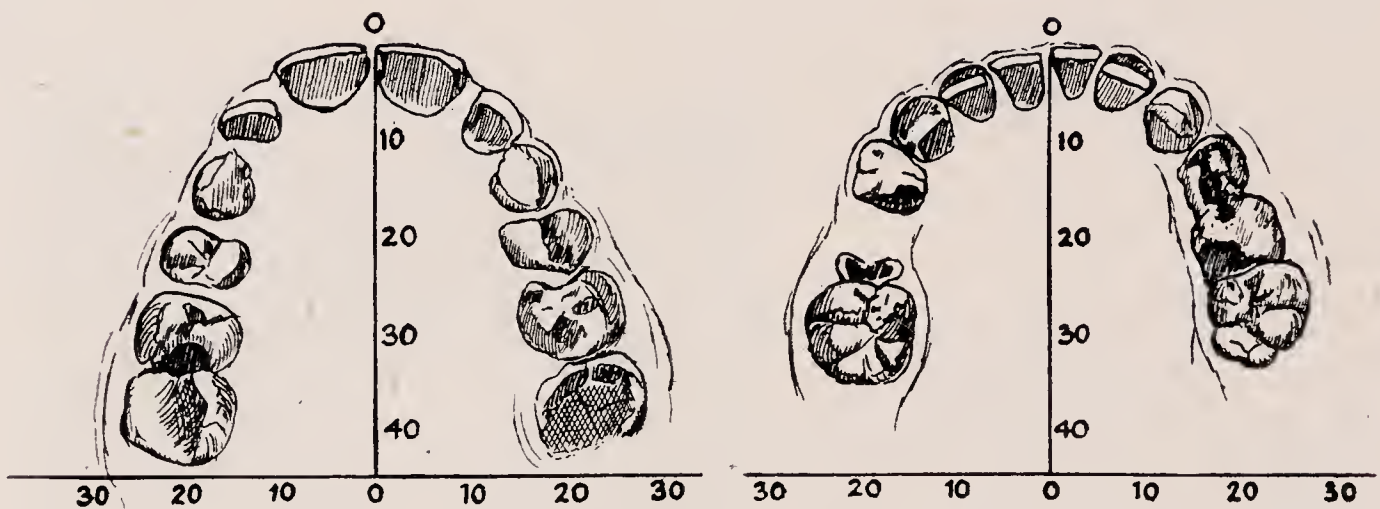


Fig. 4.

Fig. 4.—Drawings of the models of a case of vertex presentation, left occipito-anterior position. The arches are flattened on the left side.

The drawings, fig. 4, are from another case in which labour was delayed. Unfortunately the models have been lost but the drawings made by W. Finnerty show considerable flattening of the arch of the lower teeth and to a lesser degree that of the upper teeth.

In the third case the labour was prolonged and forceps were employed. The mother stated that the "head was out of shape at birth." The flattening of the arches on the left side, especially the lower one, was very marked.

In the cases of right occipito-anterior position which came under observation the flattening of the face and the arches, when present, was on the right side.



The models shown in fig. 5 are those of a boy about five years of age. The occlusion is abnormal, the mandibular teeth being posterior to their normal relation with the upper teeth. The parents were healthy, with normally developed jaws. This child was an example of face presentation and the labour was prolonged. Before complete extension occurs in face presentations, the head passes through the brow position and the diameter of engagement is the mento-vertical, i.e., from the point of the chin to the most distant point of the vertex as seen in fig. 6. Whilst this is maintained the jaw must be compressed.

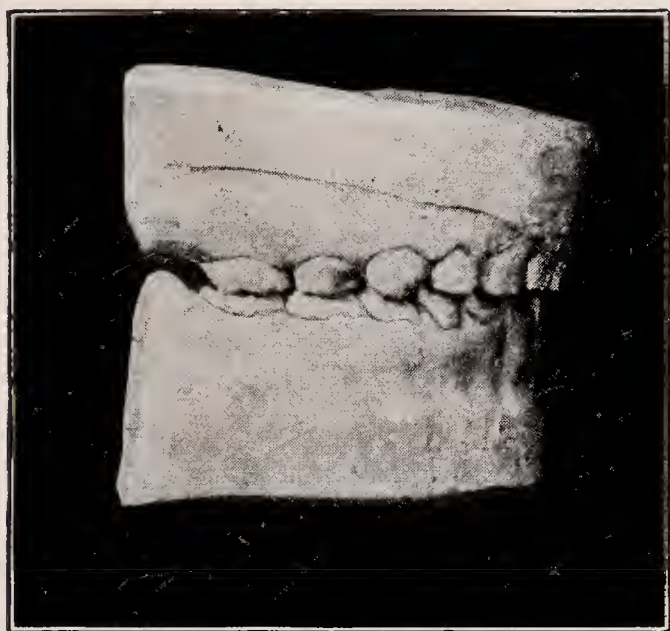


Fig. 5.

Fig. 5.—Models of a case of face presentation with difficult labour. The mandibular teeth are posterior to their normal relationship with the maxillary teeth.

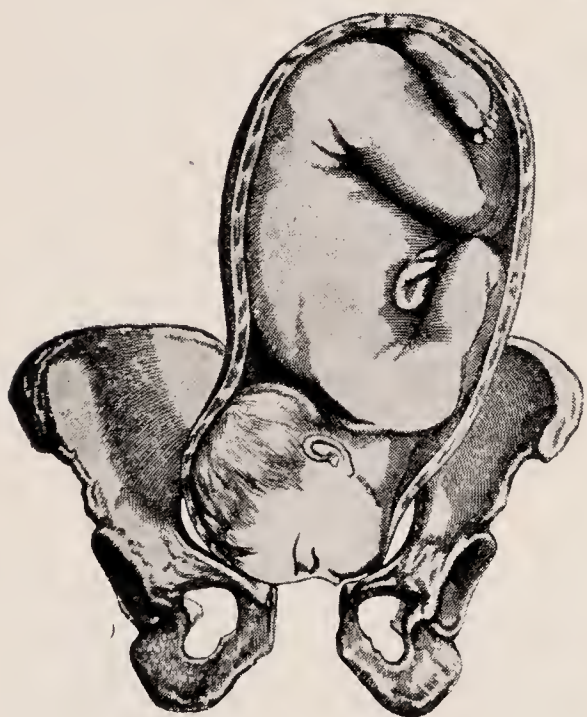


Fig. 6.



Fig. 7.

Fig. 6.—Diagram of a face presentation. Reproduced from "A Manual of Midwifery," by A. L. Galabin, third edition.

Fig. 7.—Models of a girl at the age of eleven years with abnormal occlusion of the teeth associated with a difficult face presentation.

As fuller extension occurs, the occiput is compressed against the spine and the chin slips up, the diameter of engagement then being the cervico-vertical and cervico-bregmatic; at this stage there is no undue pressure on the chin. It seems quite possible, therefore, that if labour is prolonged during the mento-vertical stage permanent injury may be done to the mandible.



In another case, fig. 7, of delayed face presentation the anterior teeth were unduly prominent. The child was breast fed and there was no trace of adenoids. The occlusion was abnormal, the mandibular teeth being posterior to their relation with the maxillary teeth. The jaws of both parents were well developed, and the remaining children in the family—four in number—had well-developed arches and normal occlusions.

The change which occurs in the position of the mandible may be due to an inward bend of the necks of the condyles, a condition which is seen in the mandibles of children with flattening of the incisors from the action of the comforter or sucking the thumb.

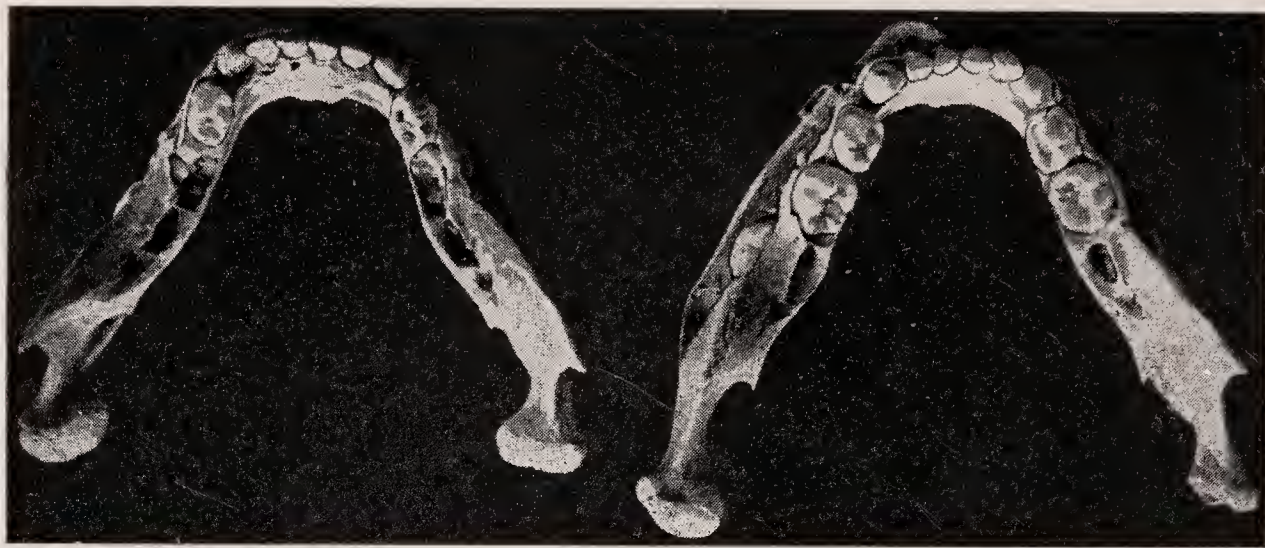


Fig. 8.

Fig. 8.—(a) Normal mandible of a child. (b) Abnormal mandible of a child showing an inward bend in the necks of the condyles.

A mandible showing this inward bend of the necks of the condyles is illustrated in fig. 8, where it is photographed by the side of a normal specimen.

Included in the records of cases sent to me were three examples of face presentation.

(1) A male, aged three years. The presentation was the left mento-anterior; labour was natural; the child weighed 9 lb. 7 oz. The occlusion of the teeth was normal and there was no apparent deformity of the arches.

(2) A male, aged four and a half years. This was described as a difficult case but the position was not stated. Owing to the conduct of the child it was not possible to obtain models of the teeth but as far as could be ascertained the occlusion was normal.

(3) A female, aged six and a half years. The presentation was the right mento-anterior; labour was normal. The arches showed flattening of the left side with the maxillary molars slightly in advance of their normal relationship with the mandibular teeth. In the right mento-anterior position the left side of the head looks posteriorly and so sustains the greater pressure. The drawing, fig. 9, shows the position of the face at the pelvic floor before anterior rotation has taken place in right mento-anterior cases.

Breech presentations are classified according to the position of the child's sacrum in the pelvis. The most frequent position is the left sacro-anterior, then the right sacro-posterior, the right sacro-anterior and left sacro-posterior positions being rare.

In breech presentations the delivery of the after-coming head is sometimes carried out by jaw-and-shoulder traction. This manœuvre consists in placing the index finger of one hand inside the mouth so as to obtain a grip on the lower jaw, the fingers of the other hand being used to grasp the shoulders from behind as shown in fig. 10.





Fig. 9.

Fig. 9.—The position of the face at the pelvic outlet in right mento-anterior face presentations. From Edgar's "Practice of Obstetrics," edition 6, p. 353.



Fig. 10.

Fig. 10.—The extraction of the head in breech presentations by the jaw-and-shoulder method. From Edgar's "Practice of Obstetrics," edition 6, p. 697.



Fig. 11.—Drawing showing the position of the child in a case of breech presentation, left sacro-posterior position. From Edgar's "Practice of Obstetrics," edition 6, p. 371.

Fig 11.



In the following three cases this method had been practised :—

(1) A male, aged five years. The position was the right sacro-anterior. The occlusion of the teeth was normal.

(2) A female, aged five years. The position was the left sacro-posterior. There was considerable flattening of the arches on the right side, this was especially noticeable in the upper arch. In the left sacro-posterior position it is the right side of the head which sustains the greater pressure. The position of the child in this position is shown in fig. 11.

(3) A female, aged about five years. The position was the right sacro-posterior. Labour was induced owing to albuminuria. This child showed definite evidence of injury to the mandible. The occlusion of the left molars was practically normal but on the right side the mandibular second molar was internal and posterior to its normal relationship with the maxillary tooth, fig. 12. At the age of eleven this child showed marked protrusion of the maxillary teeth. The report of the radiographer was as follows:—"The condyle on the affected side appears on closure of the mouth to be well in the glenoid cavity with the neck of the condyle in line with the posterior border of the ramus."

In another case of breech presentation the details of the labour were not available with the exception that labour was forty-eight hours and that forceps were employed. There was definite protrusion of the mandibular teeth.

A case was recorded by M. H. Cryer<sup>10</sup> of a breech presentation in which there was protrusion of the mandible. Radiographic examination showed sub-luxation of the condyles on the eminentia articularis.

Injury of the mandible in breech cases is recognised by obstetricians. Edgar in the section of his book dealing with the pathology of the newly born states that fractures of the lower jaw occur, as a rule, from traction on the after-coming head in breech presentations.

Faulty application and injudicious use of the forceps may result in injuries to the jaws. A case is illustrated in fig. 13. There is marked prominence of the upper teeth due to defective growth of the mandible, the result of injury from forceps. The face was lacerated on the right side from the angle of the jaw to the chin.

The models, fig. 14, show protrusion of the mandibular teeth, the first molars being well in advance of their normal relationship with the maxillary teeth. This was a case of vertex presentation, the labour was difficult, forceps were employed, one orbit being injured.



Fig. 12.

Fig. 12.—Models of a child showing abnormal occlusion of the teeth in a case of difficult breech presentation.

<sup>10</sup> *Dental Cosmos*, Vol. 48, p. 1078.



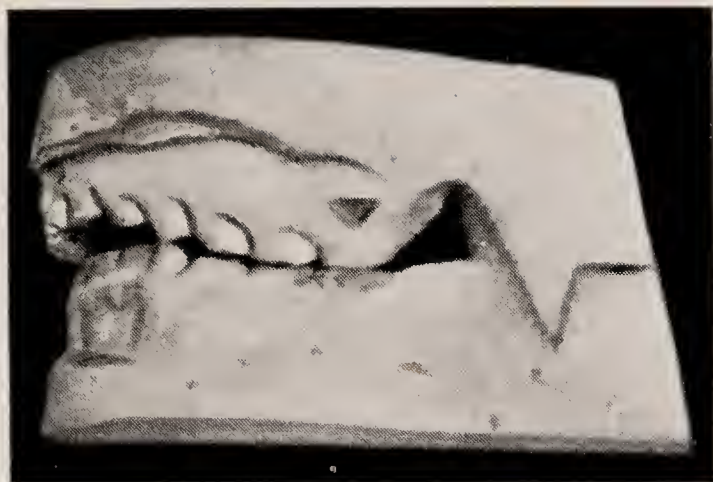


Fig. 13.

Fig. 13.—Models of a child showing the results of injury to the mandible at birth from forceps.



Fig. 14.

Fig. 14.—Models showing protrusion of the mandibular teeth from a case of difficult labour, vertex presentation, in which forceps were employed.

In another case of inferior protrusion associated with flattening of the left side of the face there was also a history of difficult labour.

In conclusion, there is, I think, evidence to show that asymmetry and deformity of the dental arches may, at times, be due to difficult labour.

I wish to thank Dr. Wilfred Shaw for so kindly looking through the script of this paper and for his suggestions and criticisms. In a letter to me he says that he "would agree that with forceps cases and with difficulty in extracting the after-coming head of a breech, dental deformities may very well result at a later date. I doubt very much whether normal labour even with face presentations would result in injury to the jaws. You must remember the thick pad of fat in the cheek and also that the main pressure is exerted not on the face but either on the vault of the skull or the base."

My thanks are also due to Messrs. Longmans, Green and Co. for the loan of blocks and to the publishers of Edgar's "Practice of Obstetrics" for permission to copy illustrations from that work.



## DISCUSSION

**The President, Mr. S. A. Riddett**, assured Sir Frank Colyer of the thanks of the Society for his valuable paper. He wondered whether Sir Frank could enlighten them as to the occurrence in animals of "moulding" or other distortions during parturition.

**Mr. J. F. Pilbeam** heartily thanked Sir Frank Colyer for his most interesting communication. He had been in the fortunate position of being able to read Sir Frank's paper before the meeting and had obtained the opinion of Mr. Hudson, obstetric surgeon to the North Middlesex County Hospital, concerning the likelihood of dental deformity arising from difficult labour. Mr. Hudson said that moulding affected the head only, and as the facebones were well developed at birth they could hardly be affected by pressure. The normal stresses and strains of bone would enable this tissue to withstand considerable force before yielding to distortion. With reference to forceps delivery traction is applied to the vault of the skull. There could be an inward bend of the condyles, but owing to the shallowness of the glenoid fossæ permanent displacement of the mandible would not be likely to arise. Breech presentations are about 1 in 40 cases. In jaw-and-shoulder traction cases the surgeon's finger is passed partly down the œsophagus and the lower jaw is protected by the soft tissues. Accordingly, injury to the jaw from this method of delivery must be negligible. Brow presentations are extremely rare and any dental deformity which might happen would be infinitesimal. It was Mr. Hudson's opinion that asymmetry due to lateral pressure could not be considered because of adequate development of the face bones. He instanced the difficulty of the surgeon in cleft palate cases in which it was desired to close the cleft by manual pressure and which was not always successful. Mr. Hudson considered that asymmetry was probably due to postural defect. The baby's pes cavus was originally thought to be caused by injury at birth and it is now known to arise through abnormal posture of the foot. It is, therefore, probable that cases of asymmetry existed before birth. Many people have asymmetry which is probably due to hereditary influences. Mr. Hudson was definitely of the opinion that very few, if any, dental deformities can be traced to injury at birth. I should like to thank Mr. Hudson for so kindly giving his views on the problems raised in Sir Frank Colyer's paper.

**Mr. L. Russell Marsh** said that he would like to associate himself with other speakers in thanking Sir Frank Colyer for a most instructive paper, and for the valuable research which had gone to its making. To the orthodontist this was a subject of vital importance and he agreed with Sir Frank Colyer that further research should be undertaken. In considering the attitude of the gynæcological experts we should remember that they *were* experts, whose opinion might be influenced by their own skill and judgment in the use of instruments. We all knew what variety of skill was commanded by different colleagues in the removal of the humble molar, and considering the matter objectively we should hesitate to say that no damage could happen to the mouth as a result of using instruments. He thought the coincidence of increase of dental abnormalities with increased difficulty of childbearing was worthy of note. He would like to ask Sir Frank whether the skulls in the Museum were those of still-born children and those who had died immediately after birth, and if so, whether it was possible that, had they lived, the abnormal shape of the face would have resolved or partially resolved in time.

In reply, **Sir Frank Colyer** said that with regard to the remarks of the President, he did not know whether moulding or other distortions occurred during parturition among animals. He was much interested in Mr. Pilbeam's statement about the views of Mr. Hudson. With regard to the inward bend of the neck of the



condyle, he had not suggested that it was due to forceps but to backward pressure on the condyles in certain stages of face presentations. In breech cases the delivery of the after-coming head by jaw-and-shoulder traction was, in skilful hands, not likely to lead to injury, but as Mr. Marsh had stated it might be otherwise when carried out by less skilful operators. In reply to Mr. Marsh, it was impossible to say whether the deformity seen in some of the skulls of children who had died immediately after birth would have partially resolved in time. The main object of his short paper was to draw attention to certain cases of asymmetry of the arch and other deformities which he had observed in cases of difficult labour. He did not state that they were in the relation of cause and effect although in some of the cases he thought such was the case. The whole question was worthy of careful investigation and he hoped that his communication would arouse the enthusiasm of some members of the Society to carry out such an undertaking. A start might be made on the following lines:—A series of say 100 cases of the left occipital anterior presentations and a similar number of right occipital anterior presentations should be examined about five or six years of age and models taken. By that means one would be enabled to ascertain whether when flattening of the arches was present the side affected was correlated with the type of presentation. A series of face cases and breech cases could also be examined. It was obvious that the deformities would be most likely to occur in cases where the labour had been difficult.

# Modernised Expansion Plate Worn at Night Only

By O. HENRY, L.D.S.Eng.

**I** HAVE been asked to come here to-day, to tell you what I know about the Vienna system of straightening teeth.

When I was last in Vienna, just before the war, I spent two most interesting afternoons studying their methods, and found that they had solved their problems very cleverly, and were getting wonderful results, both with grown-ups and children.

In pre-war Vienna all dental students came under the direct influence of Professor Oppenheim, who as you know, had a world-wide reputation for research in orthodontics. Later, "in practice," they may not have agreed with all his premises; still he held the men together, and they collaborated in trying to find a practical method for the correction of irregularities, with the result that they practically gave up using cemented appliances, and did their work with a modernised expansion plate, which by virtue of its construction becomes active during sleep, and is therefore worn at night only, and to which they applied effectively all the delicate springs of modern orthodontics. So with their combined efforts they have given to the profession, something reactionary, and at the same time revolutionary.

Let me quote from a paper by Professor Schwarz which came out before the war: "How is it that this apparatus, which is as old as the first artificial denture, quite one hundred years, and which during all this time has played a secondary role to cemented appliances, should now be gaining ground, just at the time when our cemented appliances seem to have reached perfection?"

It is because, in spite of all progress, the inherent disadvantages of cemented appliances remain, that is:

1. The difficulty of their perfect adaptation and adjustment.
2. The danger of pressure becoming distorted during mastication.
3. The inadvisability of applying pressure continuously, as shown by the findings of Gottlieb.
4. Danger of caries.
5. Expense of material, and other minor disadvantages.

*Fig. 1.* A ledge of vulcanite is built at the front of the plate, at "A" upon which the lower anterior teeth bite, opening the bite, just a little more than the teeth are apart when we are asleep, and the natural tendency of the patient is to force the plate up higher, so as to bring the jaws into the same relationship as they have when we are asleep, and naturally the lips close firmly. This brings nasal respiration into play, with its accompanying thrust of the tongue into the oral cavity, and produces the suction necessary to hold the mandible in place, while the patient sleeps.

*Fig. 2.* In this way, the action of the plate depends upon muscular forces, just as in the Andresen system; the difference being that in the Andresen system, the child must keep the jaws together and the lips closed or the plates will fall out. This effort, at first voluntary, later becomes a postural reflex, prevents breathing through the mouth at night, and produces a beneficial effect similar to that of the oral screen. Thus by their construction, these methods bring into action that group of muscles which are specific in forming normal arches



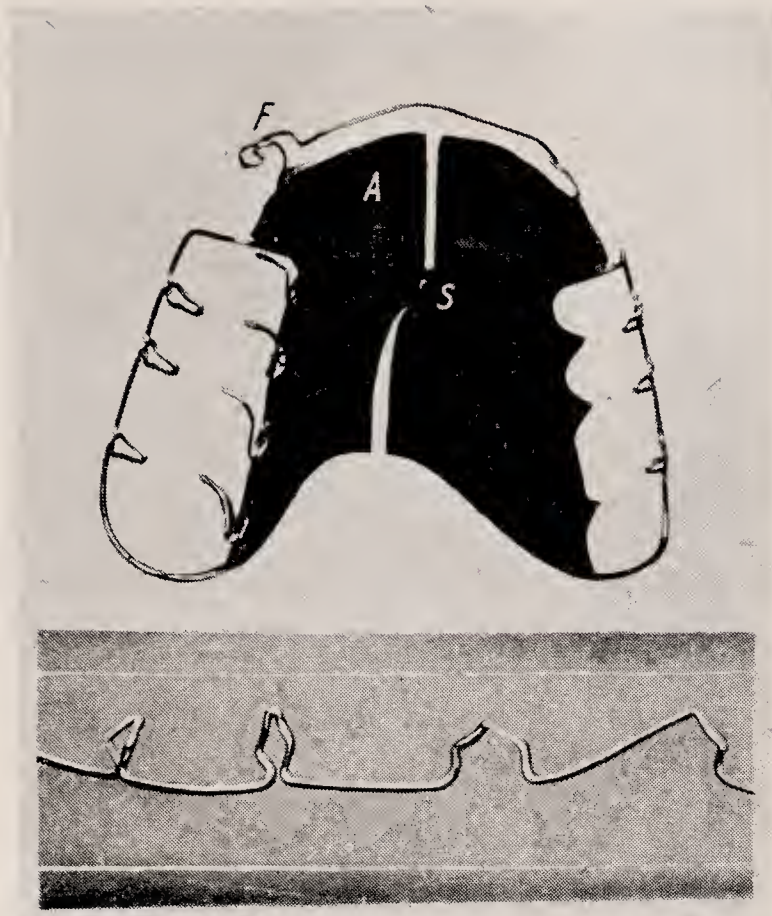


Fig. 1.

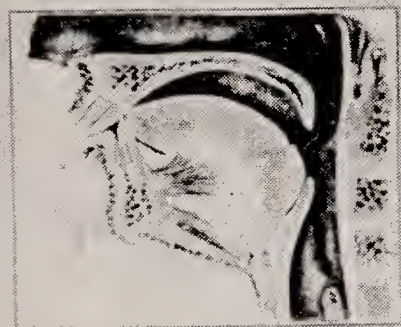


Fig. 2.

Relationship existing between the lips, teeth and tongue in the mouth-breather with a well-developed case of Class II (Div. I). (After Lischer.)

Relationship of the tongue, teeth and cheeks in the mouth-breather. (After Lischer.)

Relationship of the lips, teeth and tongue in normal respiration. (After Lischer.)

Relationship of the tongue, teeth and cheeks in normal respiration. (After Lischer.)



and normal occlusion, i.e., the tongue with the muscles of mastication and deglutition.

To quote from Richard Summa: "The teeth are formed in a mould with the tongue on the inside and the lips and the cheeks on the outside, and if these muscular forces function normally during the period of eruption of the teeth there will be normal occlusion."

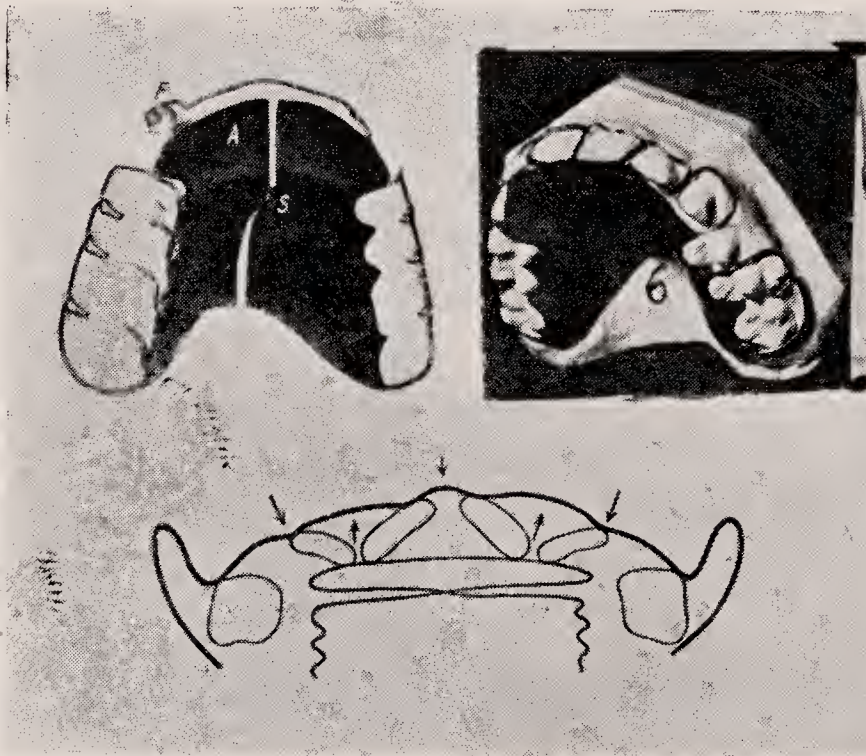
The Andresenists, who had a strong following on the Continent centred at Prague, called themselves "Functional Therapists," and claimed as their followers, all those who did not use cemented appliances—among them myself—and I certainly agree with one principle of theirs, i.e., to bring function more into our problem, and not rely entirely on mechanics. And I claim that the Vienna school also are functional therapists, because the opening of the bite, which they call "making the plate active," is in reality calling in muscular force to help them do their work.

*Fig. 3.* There are further advantages in opening the bite:

1. You have free movement of the teeth, i.e., the bite is unlocked and the opposing teeth cannot impede the movement of the teeth opposite.

2. There is more freedom in the use of the labial bow and cribbing wires because occlusion does not interfere.

3. Biting on the incisal ledge of the upper plate will depress the lower incisors and allow vertical growth in the lower molar and pre-molar region—the most important factor in the correction of post-normal occlusion cases, otherwise they will relapse. The curve of Spee must be corrected.



**Fig. 3.**

*Fig. 1 (again).* The Vienna group have given us a new type of cribbing called the "arrowhead cribbing." It works on the principle of the Crozat, the difference being that each arrowhead grips the two adjacent teeth at opposite points in the interproximal space, above the contour. An illustration at the bottom of figure 1, shows how to bend the cribbing.

First, the four angular bends are made, then with narrow pliers these bends are pinched together at the base of the wire, and the arrowhead then bent at right angles. We are fortunate in having here with us in London, Dr. Tischler, one of the founders of the Vienna method, and he has authorised the Dental Manufacturing Co. to make and market the pliers he invented, and whose use greatly simplifies the making of the arrowhead cribbing. *Fig. 4.*





Fig. 4.

Stainless steel has more resiliency and is more positive in action than any other wire we have, but it can be vicious and dangerous: vicious, because, if allowed to work continuously in moving the teeth, it moves them too quickly, and Nature's reparative processes cannot take place. However, in the Vienna system, it does not work continuously: it works only at night.

The other danger is torsion of the wire at the fixed end. When simple round wire is used and the tooth fails to respond immediately to the tension of the wire, the wire will twist and ride up, down or sideways on the inclined planes of the tooth, torsion taking place at the fixed end: but, in the Vienna system, this problem has been effectively solved by using a double spring wire—one bent back upon itself, and therefore torsion cannot take place at the fixed end, and the spring, having a flat surface, must remain as placed on the tooth.

*Fig. 5.* Another innovation is the placing of the springs. By a novel way of making a boxed space in the rubber, to allow the free movement of the springs, they are able to use the delicate looped springs of the lingual arch technique.



Fig. 5.

As you see on the plaster model, the active part of the spring which forms the loop, is covered by a cement, such as Harvard cement, and after vulcanization, it is drilled out, and you have the open space in the rubber for the spring to function in. Cement must



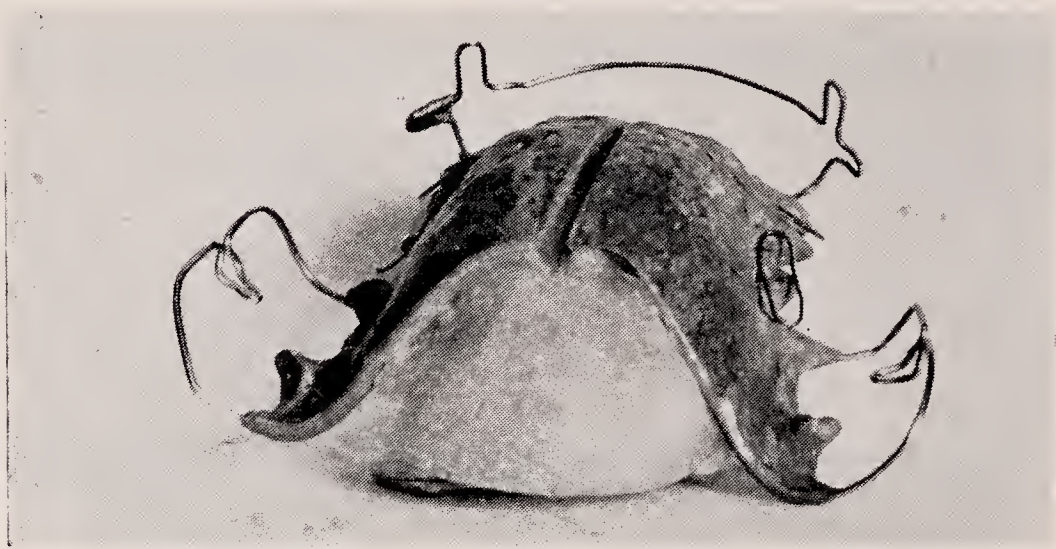
be placed over all the springs which lie beneath the rubber, so that the springs can go back into the open space in the rubber when the plate is forced into place, and the spring then has freedom of action and can work delicately and effectively.

*Fig. 6.* I show this plate because of the size and shape of the recurved spring is interesting. For movement of the anterior teeth, the labial bow, made famous by the Hawley retainer, is used, with all its various modifications and improvements.



**Fig. 6.**

*Fig. 7.* Shows the labial bow wire which comes down to the edges of the incisors to tip them inwards.



**Fig. 7.**

*Fig. 8.* Shows the labial bow wire with projections to push the teeth mesially or distally.

*Fig. 9.* Shows the labial bow wire with projections extending over the edges of the central incisors, to reduce them in length, as in post-normal occlusion cases.

*Fig. 10.* The Fisher expansion screw is constructed along scientific lines by a jeweller. It is small, flat and comes in different sizes. There are four stations to the turn of the screw, and each station gives one fourth of a millimeter expansion, and when given weekly, makes a millimeter expansion per month. This has been so adjusted, because Oppenheim, of Vienna, demonstrated in his recent work on animals, that the tissues take more kindly to this degree of expansion. A clasp comes with the screw for holding the screw firmly in place during vulcanizing—the larger portion stands above the wax and becomes embedded in the top or the reverse of the flask. When one saws the plate into its two halves, the two parts of the clasp are easily removed and can be used again.





Fig. 8.



Fig. 9.

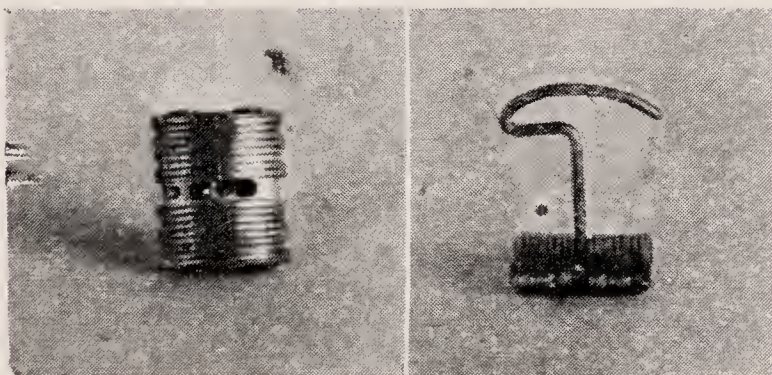


Fig. 10.

*Fig. 11.* They have an ingenious way of using this screw in block movement, as you will see from the illustration at the top. The movement is in the direction of the arrow. Below to the left, is a lower plate, where one segment only, molars and premolars are moved backwards. On the right, is an upper plate which works in the same manner. This was formerly considered impossible by orthodontists, because, when using cemented appliances, one could not get enough anchorage or resistance in the front part of the mouth, to push the molars back, but by this method you can see it can be accomplished, the explanation being that it is not only the teeth that form the anchorage, but also the bones and gums beneath the plate, which give the extra resistance necessary.

*Fig. 12.* Shows a lower plate where block movement has been applied. You see very clearly the boxed space for the looped spring to move the incisors forward.

*Fig. 13.* A lower expansion plate, showing the application of the looped wire in such cases: the expansion screw is of the old type, and is called Tischler screw.

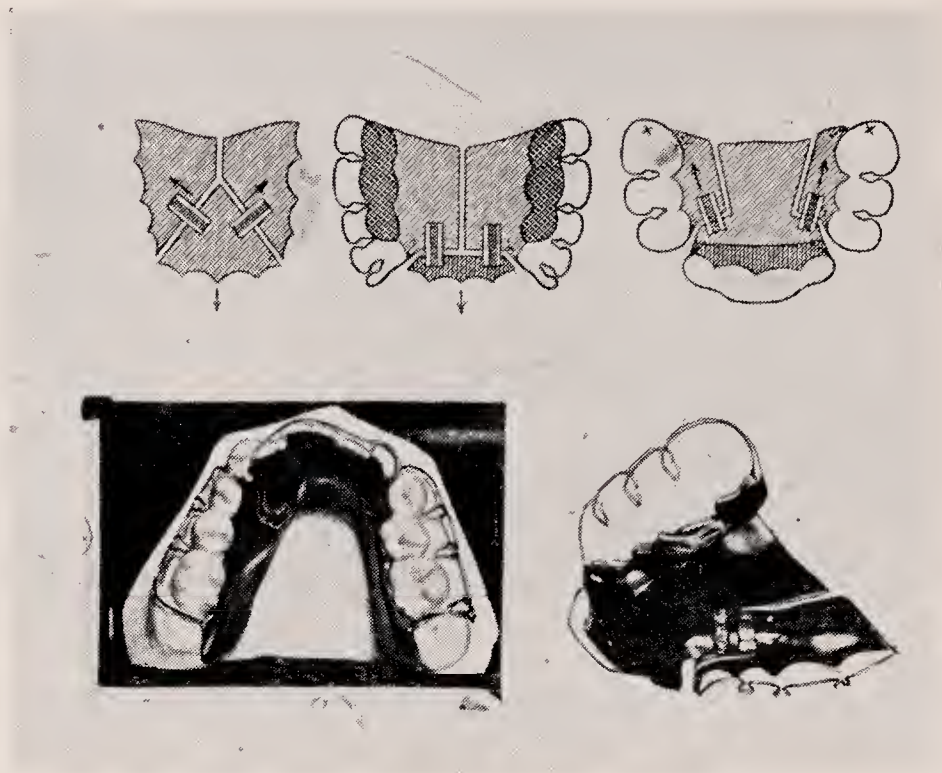


Fig. 11.



Fig. 12.





Fig. 13.

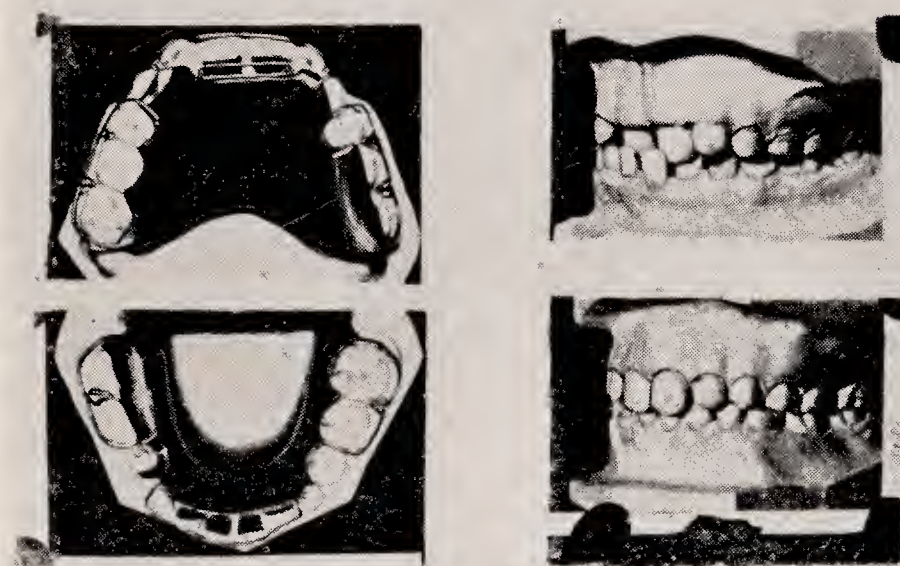


Fig. 14.

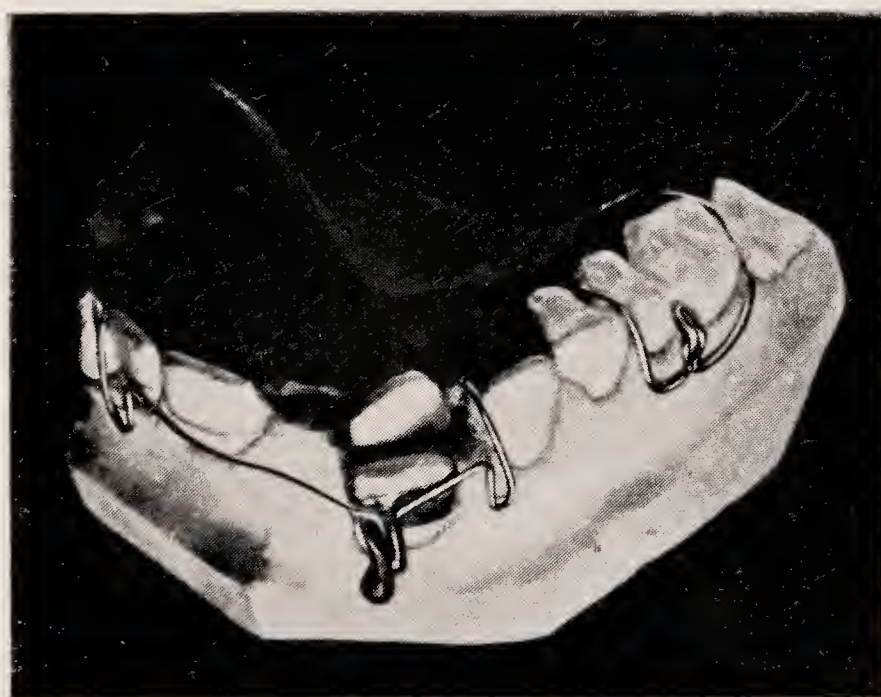


Fig. 15.

*Fig. 14.* Shows a case where the irregularity is such that one cannot use the anterior ledge to open the bite, one uses surfaces over the molars on the one side, and a ledge at the canine region on the other side, and on the lower, a surface of the molars opposite to the one on the upper. One of those delicate loop springs on the lingual to push the central incisors forward; the labial bow pushes the lateral incisors into place, and on the lower, the labial bow pulls the incisors back.

*Fig. 15.* Is an irregularity caused by supernumeraries which have



been extracted. The central is banded, has a lug with a slot extending gingivally, into which the bent wire of the labial bow fits on the principle of Andres Jackson of Philadelphia. In this manner you get bodily movement of the tooth. You see clearly here how the anterior portion of the plate is built up to open the bite.

In orthodontics, Newton's law that with every action there is an equal and opposite reaction, must be kept in mind, otherwise endless difficulties will arise, especially with cemented appliances. In this type of appliance all the springs you place will react on the anchor teeth, shifting and twisting them out of position: added to this, there is the strain and stress of mastication on the labial and lingual wires.

In this respect, the Vienna system is ideal, as the plate takes up all the strain or "back-fire" of the springs, and as already stated, biting the plate into place makes the plate and the springs "active," and therefore quite as much depends on muscular function as on mechanics.

Of course this system cannot function where the patient has the mouth open during sleep, as the patient must bite on the plate to make it active. Therefore, in such cases in Vienna, they first put in an oral screen—which they call a Körbitz plate—to correct the mouth-breathing, before they proceed with the straightening of the teeth.

I am afraid I have only been able to give you a very sketchy idea of this interesting method, and I hope that you will not ask me searching questions, for I only became interested in it when Professor Korkhaus showed some of the plates you have seen at the last E.O.S. meeting here in London. Shortly after that meeting, I went to Vienna to find out more about this work, for it seemed to confirm principles I had discovered through practical experience and which I had been applying with the Crozat in my practice.

## DISCUSSION

**The President** thought everyone present would agree that, although Mr. Henry had stated in his paper that he had only been able to give a very sketchy idea of the Vienna method, the way in which he had described the appliance did him very great credit. Personally he was not in a position to discuss the merits of the appliance, as he had not had an opportunity of examining it carefully, so he would ask Mr. Chapman to open the discussion.

**Mr. H. Chapman** said that the Society had been fortunate in having had the views of practitioners abroad conveyed to it from time to time, and on the present occasion it was under an obligation to one of its own members for a description of the Vienna system. He was not sure whether Mr. Henry had spoken from his own experience or from what he had seen in Vienna. He regretted that he had no personal experience of the method, but there were some remarks in the paper which might be discussed in relation to orthodontic practice in general. Presumably, Mr. Henry believed with Dr. Summa, whom he had quoted in his paper, that there would be normal occlusion if certain muscular forces functioned normally during eruption. If that were so and that were all the problem, the practice of orthodontics would be comparatively simple. Miss Clinch had shown, however, that the size and relationship of the jaws might be in error at birth and that, therefore the cause was probably operative before birth and was something more intangible than abnormal functioning of the muscles of the tongue, lips and cheek, but it was not known what it was. The correction of the size and relationship of the jaws was probably much more difficult than the correction of the causes mentioned by Dr. Summa. Research



workers said that when a tooth was moved bone was absorbed on the side of pressure and deposited on the side of tension, and there was no reason to doubt the truth of that statement. Were those changes permanent? Permanency was the crux of the problem. It was known that many tooth movements relapsed, and research workers had not explained that. The bone changes they described were not the whole story; other later and perhaps more important chapters remained to be written. At present it was the clinical happenings which were all-important to orthodontists.

Teeth were moved so easily that orthodontists were apt to overlook what they were endeavouring to accomplish. Tooth movement was only a means of effecting changes in the supporting tissues of the teeth, particularly in the bone and the periodontal membrane, and those changes were not all of one kind; they were of various kinds, according to what the orthodontist was attempting to do. In typical Class I cases the object was to enlarge the jaws. Did any orthodontist ever stop to consider the possibility of doing such a thing? If it were possible, was there any limit to the enlargement that could be produced? Rotation of teeth involved other bone changes, chiefly in the socket, absorption in some places and deposition in others, also changes in the periodontal membrane. Inclination involves still other bone changes, and opening the bite involved depression and/or elevation of the teeth in their sockets, implying still further bone changes. When orthodontists were discussing an appliance they had to think of it as something not so much for producing tooth movements as for bringing about bone changes, not changes for to-day or for to-morrow but permanent changes. On reflection, would not it be extraordinary if orthodontists could bring about all these changes permanently by any appliance whatsoever? It was particularly intriguing if it could be done with a removable appliance worn at night only.

If the troubles were due to malfunction of the tongue, lips and cheeks, it might be that a simple apparatus worn for a part of each 24 hours for a period would effect a cure and bring about normal occlusion, but if they were due to what he might call developmental errors of bone the cure was, in his opinion, much more difficult. However, the vital test was clinical experience, not beliefs. Mr. Rushton had said to him in a letter that week: "Belief is not generally based on data in our profession." Must not that attitude of mind be changed? Surely data were the only foundation for belief; otherwise one was building on sand. In orthodontics beliefs had been accepted as facts, and, as a result, progress had been delayed. The members of the Society were indebted to Mr. Henry for having introduced them to the Vienna system, the practitioners of which Mr. Henry said had solved their problems very cleverly and were obtaining wonderful results with adults and with children. He looked forward to the Society receiving more reports on this method.

**Dr. Nove** endorsed Mr. Henry's statements with regard to the Vienna system, but said there was one point which seemed very difficult to follow, namely, the vertical growth which was associated with the depression of the anterior lower teeth. From the remarks made by Mr. Henry it would seem as if the movement was reciprocal, but it was difficult to believe that the depression of the anterior lower teeth would cause vertical growth of the posterior teeth. In another part of the paper Mr. Henry stated that the muscles of mastication and deglutition, during the wearing of the appliance at night, caused a development of the tissues, and it seemed that he intended to indicate that the act of deglutition caused the vertical growth, but that again was very difficult to follow, because the jaws were not orientated by the appliance in such a way that they would take up the same position after every act of deglutition. The raised platform



was simply a flat surface, and there was nothing in it to guide the jaws to resume the same position every time the act of deglutition took place. It would seem that what was required in the first instance was that the jaws should be orientated in such a manner that each time they were brought together the same positioning would take place automatically, and it was in that way only that the action of the facial muscles and that of the mylo-hyoid muscle would constantly operate in the same way and so prove effective. Perhaps Mr. Henry would elucidate that point and say whether he meant that there was some special way of orientating the jaws which would help the muscles to become definitely operative.

**Mr. L. Russell Marsh** said he would like to thank Mr. Henry for his very important paper and also to add his own experience. He had been very much impressed by Professor Schwarz's results when he saw them in Germany just before the war. Professor Schwarz had dealt with an enormous number of cases of every type, and in many of them he was able to show models taken five years later, proving the permanency of the results. At that time he himself had been definitely a sceptic and he had had a long argument with Professor Schwarz on the question of relapse taking place if the appliance was worn only at night. Professor Schwarz told him that at night the tooth was moved through one unit of distance and that in the day time it might relapse two-thirds of that distance, but the next night it was moved again, and so gradually progress was made. Professor Schwarz laid stress on the fact that one could be much more sure of the permanency of the movement when the child did not wear the appliance in the day time, the argument being that, if the case was going to relapse ultimately, there would be a good deal of relapse each day and therefore no progress, and that the progress which was, as it were, hardly earned at night would be permanent. That had been his own experience. He had done a great deal of work with Professor Schwarz's appliance and also with the Norwegian system and had found that very good results could be obtained, but they were brought about much more slowly than when a fixed appliance, worn in the day as well as at night, was used. He was treating his own daughter with various kinds of appliances, including the Schwarz appliance, entirely at night, and he hoped to be able to show the members the result in due course. He had one or two finished cases which had been treated only at night. He had not used that treatment in every case, as he felt that sometimes a quicker treatment was required.

The theory of the system described by Mr. Henry appealed to him very much, because he had always felt that the one aim of orthodontists should be to restore normal function at the earliest possible moment, yet with their appliances they definitely tended to inhibit normal functioning of speech, particularly when the appliance was worn during a very vital period, and the method in question did seem to solve the problem, by giving the child the normal use of the mouth during the day, the treatment being carried out at night. His experience was that if the child could be persuaded to wear the appliance for some time during the day the progress made was very much more rapid. He felt that there was no muscular pressure at night, and sometimes the results obtained were rather disappointing, but, if the child became accustomed to wearing the appliance and biting on it for some time during the day, then some sort of movement went on with that familiar appliance during the night. With regard to the limit of the enlargement possible by expansion, to which Mr. Chapman had referred, his idea had always been that the limit was the amount of growth which would have taken place if the child had been perfectly normal and that, if one expanded beyond that limit, there would always be relapse, sometimes



to the limit and sometimes past the limit. In answer to Dr. Nove's question about the orientation of the jaws, he would say that the Norwegian system definitely orientated the two jaws in place.

**Mr. E. A. Hardy** said that, although he understood the vertical growth being obtained by the appliance described by Mr. Henry, he did not quite understand how the lower incisors were depressed. He had always understood that when a bite plate was put on a regulation case it was the act of mastication which caused the jaws to come together and depress the lower incisors, and if the plate in question was worn only at night, when children did not bite very hard, he could not see that it would have the same effect.

**Mr. H. G. Watkin** said that, with regard to depressing the incisors, it was very easy with a fixed appliance to get a very close bite or an open bite if care was not exercised. His own difficulty in many cases was to avoid getting an open bite. He certainly thought that the open bite in the case to which Mr. Henry had referred was due simply to the removal of the pressure. The bite was taken by the incisors in front, and the natural forces made the cheek teeth erupt and they erupted normally. He had always thought that the object of gagging the mouth in front was to allow the natural forces to move the cheek teeth together. When the teeth erupted they came down to meet some obstruction, and when they met the obstruction they ceased to grow. In the case of thumb-sucking, when the upper and lower teeth met the thumb they had gone as far as they could go and they stopped erupting.

**Mr. G. Johnson** said that he had used the Vienna system in a number of cases and was hopeful that it would produce some results which he would be able to show to the members. There was one point in connection with laboratory work which he had accidentally discovered and which might be of help to others, namely, that the fine springs were very much more easy to get out of the plaster if, according to the suggestion of Drury, the plaster in the flasks was dried off in a furnace before the putting in of the rubber.

**Mr. L. Russell Marsh** asked Mr. Henry whether there was any method of producing intermaxillary traction by the Vienna system. He used the Norwegian system in such cases and he had found that an adaptation of the idea of the Hawley retainer was sometimes very useful. In the Hawley retainer, by means of little tubes inset in the vulcanite the whole of the wire apparatus could be removed from the vulcanite, like an ordinary fixed appliance, and sometimes that could be adapted to the Schwarz method.

**The President** said he had always been accustomed to the idea that at night time, when the child was asleep, all the functions were very much in abeyance. The flow of saliva was only just sufficient to produce lubrication, and if the child went to sleep with a lozenge in its mouth the lozenge was still there seven or eight hours afterwards. He found it very difficult to understand, therefore, how the appliance described by Mr. Henry worked, and he would be glad if Mr. Henry could explain that.

**Mr. Bridgeman Williams** said he did not think that the difference between the Andresen system and the Vienna system was always clearly understood. In the Andresen system the plates were not attached to the teeth in any way whatsoever but worked purely by muscular function, the swallowing during the night and any reflex muscular movements, whereas in the Vienna system the apparatus was fixed in the mouth.



**Mr. R. Cutler** thought that Mr. Henry's paper might be taken in two parts. The first part dealt with certain principles of treatment which seemed to many members of the Society to be revolutionary and which might well be the subject of argument and discussion amongst them as well as receiving the attention of the Special Committee recently appointed by the Council. The second part of the paper consisted of a description of the technical practice whereby the principles in question were put into operation, and he thought that would be of interest to all the members, whether they favoured fixed appliances or removable appliances. Mr. Henry's remarks should, he thought, have special weight, as those who knew him and had seen his work with the Crozat appliance realised what an expert worker he was with that particular form of treatment. If an expert with one form of mechanical treatment was sufficiently convinced of its value to embark upon another and more simple form of mechanical treatment, he thought that form of treatment deserved the closest attention. To his mind, the Crozat appliances had always combined the principal advantages of a fixed and a removable appliance, provided they were properly made. They could be used for intermaxillary traction. They were not obvious when worn. They could be taken out when the children wanted to eat toffee and then replaced. If the appliance broke the child did not have to be rushed round to the dental surgeon. As a rule the Crozat appliances had to be made in precious metal—they could not be made in stainless steel—and they required very considerable skill. He thought the principle underlying them was the positive fixation that was obtained on the teeth, and that principle was equally applicable to removable appliances. A removable appliance that floated about in the mouth would not act, whether it was worn only at night or during the day also. There must be some form of positive fixation. The methods described by Mr. Lionel Markham, of Newcastle, and Mr. Visick of putting into operation the Crozat principle were methods by which positive fixation of a removable appliance could be obtained, and Mr. Henry had described in his paper a new method of grasping the re-entrant curves of the molar teeth whereby a positive fixation of the appliance could be secured. He thought that method should receive the attention of orthodontists as a matter of technique.

**Mr. C. L. Endicott** said he had not seen any of the appliances described in the paper function and he had read only one article about them, but he had had a certain amount of experience with the Norwegian system and he would like to endorse the statement made by Mr. Russell Marsh that when an appliance was being worn at night it was very advantageous to wear it also for a certain time during the day. He found that when a child practised with its Norwegian appliance for an hour a day it could keep the appliance in all night without any difficulty, and the children who said that their appliances came out at night were almost invariably those who never had any day-time practice with them. He thought that, as had already been mentioned in the course of the discussion, the Vienna and Norwegian systems were quite different. In the case of the Vienna system the appliance was definitely fixed to the teeth, whereas in the Norwegian system, in his experience, one did not want the appliance to be fixed to the teeth. The appliance only functioned and brought about results only through the muscles driving the teeth against the various portions of the plate. He therefore thought that the Norwegian system had an advantage over the Vienna system so far as changing the relationship of the arches was concerned, because the muscles were brought into play more actively than in any method he could imagine with the Vienna type of appliance, unless intermaxillary traction was possible. He would



be glad if Mr. Henry would say something about the possibility of intermaxillary traction.

**Mr. O. Henry**, in replying to the discussion, said he hoped he had made it clear that there was a new movement in orthodontics which was called functional therapy, and the Andresenists did not depend upon mechanics. He himself was now a functional therapist and worked in quite a different way from Crozat, who had seen his work and said that it was quite different from his own. Orthodontists who had come to this country with the American forces had come to see him and had told him that he had revolutionised the method. That was because he used functional therapy, which did his work for him. The Andresenists had perfected their system and now had a very large following on the Continent. He was very glad to hear the remarks which Mr. Chapman had made, which were most important. The Vienna system had been adopted because the research which had been going on in Vienna in the years before the war had shown orthodontists there that they were working along the wrong lines. That research showed that when a tooth was moved nature built highly calcified bone in front of the movement of that tooth, and it became highly calcified in about eight hours. If the pressure was relieved after about eight hours, the tooth became normal. It was also found that if the pressure was continued in moving the tooth the highly calcified bone, which would really be called sclerosed, absorbed the cement on the tooth. The results of that research were made known at the Congress in Vienna in 1936 and were published in America in 1938, and they led to the adoption of the Vienna system, in which a modernised expansion plate was used and was worn only at night.

Mr. Chapman had referred to the views held by Summa, who was the pioneer in function. He came before Rogers, who, as was well known, had been considered in America an outsider, just as Crozat had been considered an outsider, because he did not use a previously recognised technique. Summa was the first to call attention to the fact that those who had perfect arches had perfect function and that perfect function must have some relation to perfect arches. Summa's attention was first drawn to that matter by the fact that, as a musician in an orchestra, he noticed that wind instruments, such as brasses and flutes, could not be played by anyone who had an irregularity in his teeth or imperfect arches. He himself had noticed twenty years ago that people with abnormal arches or irregularities could not whistle, and that had first caused him to take up the subject of functional therapy. He was now bringing the question of function to bear on all his work, as did the Andresenists, who were pure functionists, and those who belonged to the Vienna school.

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## Localised Vertical Growth Disturbance

By PHILIP G. CAPON, L.D.S.L'pool.

**R**EFERENCES appear on occasion in dental literature to that interesting and rare phenomenon which for use of a better term may be called localised vertical growth disturbance. Various definitions of the abnormality have been suggested, but it is doubtful without a better understanding of the ætiology, whether any can be accepted as accurate. Chapman<sup>1</sup> has given this Society a communication on three cases and his observations on the progress of the irregularity are as far as I have been able to trace in British or foreign literature the only ones which cover some stages in the deformity. I am in the position to be able to present to you a number of cases with their histories showing the progress of the abnormality from its earliest appearance to, in a few, its final solution.

Writers who have discussed the condition generally give examples of what might be said to be the later stages, and from these they base their conclusions.

Whether or not my observations can throw any fresh light on the problem they will at least give an opportunity to check the findings of others.

It has to be remembered that the discussion centres around the opening of the occlusion in the deciduous tooth when a successor is present, and not when there is a congenital absence of the permanent tooth. Chapman has rightly stressed the importance of serial models of all individuals, normal or abnormal, to get a true perspective of development. Therefore, before putting before you the various theories which have been advanced, I propose to show you the life history of a classical example.

For the sake of economy—right side of mouth only shown although condition is bilateral.

CASE I.	S.H.	FEMALE.
Fig. 1.	3-9.	$\overline{d}$   first evidence of infra occlusion.
Fig. 2.	4-2.	$\overline{d}$   space increasing. $\overline{e}$   commencing.
Fig. 3.		No impaction present.
Fig. 4.		Found tongue was completely covering occlusal surfaces. Vertical intermaxillary traction including tongue shields started experimentally. Appliance discarded.
Fig. 5.	8-6.	Decided to extract $\overline{e}$   $\overline{e}$ (note complete $\overline{e}$   $\overline{e}$ absorption of roots.)
Fig. 6.	8-6.	Possible closing of $\overline{5}$   $\overline{5}$ spaces. $\overline{5}$   $\overline{5}$ erupting. Removable incline plane plate used for a short time as lower incisors were irritating palate.
Fig. 7.		Slight bilateral disto-occlusion with general absence of vertical alveolar development. No orthodontic treatment given.

I will now put before you the facts and theories that others have presented to see whether they fit this case and others which I will show you.

### Hereditary Influences

There is some evidence that this is a possibility, but as the abnormality is so rare material is scarce.

Ballard<sup>2</sup> has noted two cases and Visick<sup>3</sup> one, and I have just received





Fig. 1.



Fig. 2.

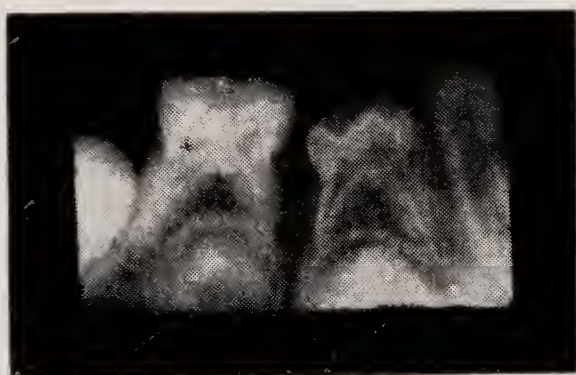


Fig. 3.

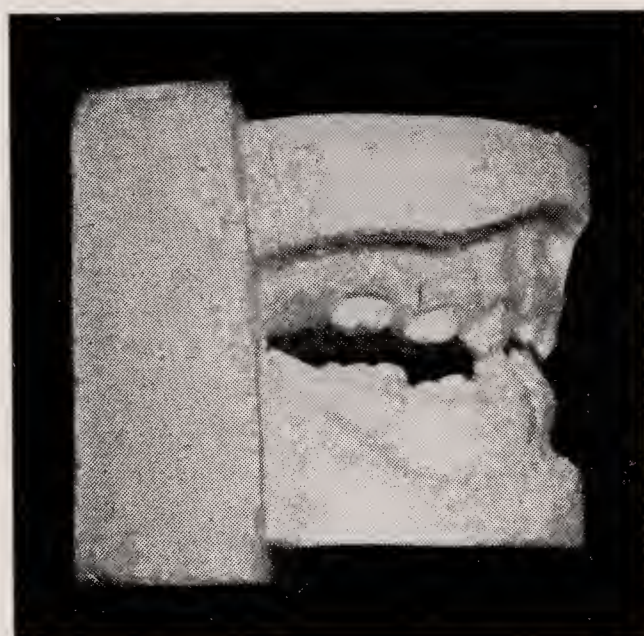


Fig. 4.



Fig. 5.



too late for inclusion, a case of a brother and sister from Hegarty, of Wigan, where upper deciduous molars are involved.

Two brothers of the case illustrated show similar deformities.

## Oral and General Conditions

In all my cases during the progress of the irregularity practically a complete immunity to caries existed, and I also found very healthy gingivæ. Ballard<sup>2</sup> remarks on slight caries in his cases. Chapman's<sup>1</sup> cases appear from his illustrations to be free from dental decay. Glucksman<sup>4</sup> does not report on the absence of caries but his examples suggest this. Skillen & Walley<sup>5</sup> do not mention the presence of caries in any of the 20 cases studied, but they report that the teeth sectioned showed poor calcification with numerous interglobular spaces. They use the argument of this imperfect calcification to hint at the possibility that early malnutrition might have helped to retard alveolar development.

Noyes<sup>6</sup> first thought the condition might follow an early history of rickets with recovery. He thought that the formation of the ebonite bone of rickets might tie down the alveolus. But when he obtained material he discovered that instead of a hypo activity of the tissues there was a hyper activity.

All my cases have occurred in private patients who have been under my care for some time. All during the progress of the phenomenon have appeared physically and mentally normal for age, and their dietary has been based on modern lines.

## Mechanical Considerations

Izard and Dorian<sup>7</sup> who have given a very full classification of the retention of deciduous teeth consider this irregularity one of secondary retention, a term which Ballard<sup>2</sup> favours. They use the description of a retreat of the tooth into the tissues, this movement being influenced by pressure from the bulbous form of the approximal teeth.

In my view this theory on the commencement of the abnormality cannot apply because if one studies the models and X-rays of the illustrated case (Fig. 3) it will be seen that the deciduous teeth are spaced when the evidence was first seen. It may be that these writers also studied advanced cases when the approximal teeth have probably increased the impaction. This can, of course, reach serious proportions as illustrated by Cole<sup>8</sup> who shows an impacted  $\underline{d}$  | in a gross position of desinclusion.

## Teeth Affected

It is peculiar that so far in my private patient cases the abnormality was usually noticed in  $\overline{|d}$  or  $\underline{d}|$ , and if the deformity progressed, by the  $\frac{ed}{e} | \frac{de}{e}$  in quick succession. Although in the case from Hegarty of Wigan the brother and sister aged 14 and 12-6 respectively are affected the  $\overline{e}$   $\underline{e}$  only are impacted.

My one exception (case 5) had been a hospital one—a male age 7-4, admitted for septic arthritis of hip, and about whom I could get no history.

But McBride<sup>12</sup> considers that the second deciduous molar is usually the first tooth affected and it may be followed by the first molar.

Skillen & Walley<sup>5</sup> report that in 12 cases out of 20 the condition was bilateral and that sometimes both jaws were affected.

## Ankylosis

All writers seem to suspect that ankylosis is the primary cause. This theory is based on the study of the few cases which could be obtained for sectioning.



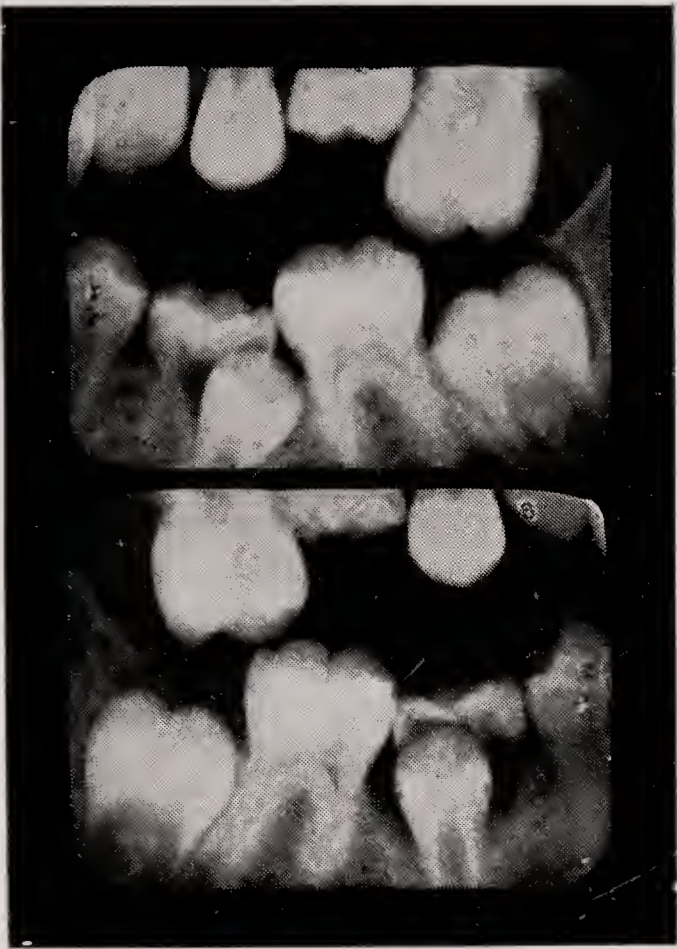


Fig. 6.

Fig. 7.



Kronfeld<sup>9</sup>, Tomes and Oppenheim have all found that absorption of a deciduous tooth does not necessarily proceed without intermission, and it occurs in excess of the amount required. Furthermore this phase is followed by actual deposition of new bone and cementum which Oppenheim claims may lead to solid union between bone and tooth. Kronfeld states that such bony union, if extensive, may prevent exfoliation and eruption of the successor.

In Noyes's<sup>6</sup> illustrations he shows that a bony tissue will replace lost tooth structure and become united with bone, but he states that this picture cannot be taken as proof of ankylosis, although this is possible.

In my opinion if it were not for the fact that there was slight infra occlusion in Noyes's case I would have suspected it is developing into one of delayed loss of the deciduous tooth.

Skillen & Walley<sup>5</sup> discovered similar bony formations in widely variable amounts and forms, but two cases (6 teeth in all) reported show no evidence of osseous union. They with Noyes<sup>6</sup> suspect that some unknown factor in eruptive force might be primarily at fault.

It has been my experience, as seen from my slides, that the absorption rate is faster than normal in this condition, whereas, in delayed loss of deciduous teeth it is the reverse. Accordingly, one might

suspect ankylosis in the latter case. In such cases the occlusion is not open. It is accepted that a deciduous tooth commences to absorb about 3 years before its exfoliation. If osseous union were the sole cause of the abnormality this would not explain a number of my cases, because the evidence first appeared at such an early age.

I suggest that this is where serial models help. In view of the fact that osseous union is not always present it is possible to conjecture even if an ankylosis did exist it might have no bearing on the problem, particularly as Oppenheim has stated that if after absorption of the deciduous root bony repair to the extent of union occurs it would be too slight to interfere with normal loss.

This is confirmed by Aisenberg<sup>10</sup> who states that this type of repair is not as complex as when no successor is present, and it is not durable enough to block eruption of a successor.

Quotations from Brash<sup>11</sup> are of interest. He stated that it is perhaps not so clearly appreciated that the alveolar growth during eruption is only a part of a general alveolar growth that is going on along the whole arch, and that certainly it is significant that the alveolar growth associated with eruption is part of a general growth by means of which the alveolar process deepens all along and it is perhaps legitimate to speculate, whatever relations exists between the two, that anomalies of eruption are in some way connected with this general growth and the factors that govern it. Finally there can be no doubt that the teeth rise with the growth of the alveolar margin.

From the clinical material I have so far obtained this theory of the alveolus carrying the teeth into position appears reasonable. It will, therefore, be of interest to hear Wilson Charles's views on alveolar development and tooth eruption which he outlined in a letter to the Editor and published in the *B.D.J.* of March 5th, 1943. It is unfortunate that his conclusions cannot be published yet. The various theories and speculations are of practical clinical importance. We know that a child has definite physical growth periods, and that these synchronize roughly with the various incisal, bicuspid and molar-area eruptions.

Does this phenomenon therefore have any bearing on that familiar condition of closed bite, which we attempt to correct by bite plate or intermaxillary traction? From the gross examples I have shown you this would be possible, but where a single tooth is involved the remaining alveolar height is fully maintained.

## Treatment

I have reported that in one case I attempted vertical intermaxillary traction and failed. Visick<sup>3</sup> has also stated that his attempts at treatment had only resulted in his moving the anchor teeth.

Although not directly connected with the problem, Noyes<sup>6</sup> in his article on Submerged Deciduous Molars reported that a first permanent molar in infra occlusion had refused to re-act to force.

Various writers, apparently because they fear that an ankylosis might have serious consequences have advised early extraction of the affected teeth, and the use of space maintainers. Noyes even recommends the removal of bone overlying the permanent teeth.

Skillen & Walley<sup>5</sup> approve of this treatment, but Glucksman<sup>4</sup> says that there is no definite reason to believe the removal of deciduous teeth of this nature is a guaranty that normal vertical growth will surely ensue, and that the permanent teeth will erupt normally.

In my own cases, bearing in mind that the absorption rate has been good, I have only removed teeth when any impaction has delayed exfoliation. In my opinion the deciduous teeth, even in their infra occlusion keep some spacing, and as I have not had much faith in the ankylosis theory I have felt there was not much risk in retaining the teeth. So far I appear to have been justified in this assumption, and



you will have seen where the deciduous teeth were exfoliated or extracted at about normal time no complications have occurred.

In closing I may say that although I have been interested in this problem for a number of years, I feel I am no nearer a solution than when I began my investigations. I have, however, arrived at the following conclusions:—

1. The deformity is first noticed at such an early age that serious movement of the successor tooth can hardly have begun.
2. The failure of the deciduous tooth to keep in line with the occlusion is, therefore, primarily due to a retarded alveolar development, rather than an interference with the mechanism of the erupting tooth.
3. Mouth health appears to be always above average.
4. There is no need to interfere surgically until about the time of full exfoliation of the deciduous tooth because its successor always erupts to a normal level.

Owing to restrictions imposed by the War, I have had to omit many illustrations of interest to support my arguments.

In the preparation of this communication I have received considerable help, as many other searchers after truth have done, from the Hon. Librarian of the British Dental Association, and I tender my grateful thanks to Mrs. Lindsay for her kind assistance.

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#### DISCUSSION

**The Chairman, Mrs. L. Lindsay**, said that Mr. Capon's paper, to which she had looked forward for some time, was a very interesting one.

With regard to the pressure of the tongue, many years ago she had contributed to the Museum a case of a very large mouth, with very well developed jaws and very good teeth, which seemed to suggest that the tongue had kept the bite open at the sides. She could not remember the case very well and would like to look at it again when it was available, but she thought it had some bearing on the cases shown by Mr. Capon on the present occasion.

**Mr. Harold Chapman** said he had listened to the paper with the greatest interest and was much pleased to find that the condition described therein was not so abnormal as he had at one time thought it to be, in that Mr. Capon had clearly shown that it was followed by normal occlusion of the premolars. Therefore he could only think that, as Mr. Capon had suggested in his summing-up, the reason for the apparent error was a retarded development of the alveolus, though it seemed strange that that retarded development should affect only the earlier of the deciduous molars, sometimes in both the upper and the lower jaws and occasionally only one tooth or two teeth. An explanation of that would be very interesting, but he did not see any possibility of such an explanation being forthcoming.

With regard to the tongue, he thought that, if that was a factor in the matter, the excellent occlusion of the premolars which had been shown by Mr. Capon on the screen would not have been obtained.

He congratulated Mr. Capon on having collected such a fine set of serial models, which he thought confirmed the theory that the condition in question was only a variation of the normal.

**Captain M. Goldstein (U.S.A.)** said he was very happy to attend the present meeting and had enjoyed the paper very much. He himself had seen a number of cases similar to those shown by Mr. Capon and had found somewhat the same problem as that which Mr. Capon had presented to the meeting. Most of his own cases seemed to be just as normal or abnormal as other cases might be when they happened to be connected with submerged deciduous molars. He did not think that caries was of very much significance in the condition in question.

**Mr. H. G. Watkin** said that Mr. Visick and he had had two cases of the kind described by Mr. Capon, Mr. Visick's patient being a cousin of his own patient. The two cases were very similar and bore out what Mr. Capon had said with regard to caries. He thought Mr. Visick had tried to carry out some treatment, which had not been successful, whereas in his own case he had taken out the deciduous teeth. In both cases the final results were very good, the occlusion being quite normal and no harm having been done at all by the open bite in the deciduous region.

He suggested that the condition might be due to lack of absorption in the deciduous molar region, but the open bite might be caused by the extra growth of the 6's. He was at present treating a patient, aged 8 years, who had the two lower 4's present and all the 6's missing. The D's and E's were present, but there were no incisors in the upper jaw. There were 5 or 6 mm. between the upper and the lower teeth. He proposed to take out all the deciduous molars, so as to give the 6's an opportunity to come forward, in order that there might be no gaps later on, and he thought that treatment would be quite successful.

With regard to caries, both Mr. Visick's case and his own were free from caries and had a very good dentition in every respect.

He would like to thank Mr. Capon for his paper, which he had enjoyed very much.

**Miss K. C. Smyth** thanked Mr. Capon for his very interesting communication and expressed her admiration of his serial models, which always taught so much more than models collected at indefinite periods.

She thought that the final results of the cases described by Mr. Capon showed that these cases might be divided into two types, namely, those in which the final result showed a close bite and those in which there was finally a full alveolar development and no close bite of the incisors.

Some years before the war she had read a paper to the Society on Anglo-Saxon skulls found in a certain burial ground, one of which showed in the mandible a condition similar to that described by Mr. Capon but it had a very strange variation which she had never seen in a child's mouth, i.e., the first deciduous molar was impacted between the permanent second premolar and the canine. The deciduous molar was still retained, but the first premolar, which should have developed underneath that tooth, had taken a slant, as it were, instead, and had come up and fully erupted lingually. It was of the same height as the other teeth but was completely lingual to the line of the arch. She could only estimate the age of the skull. There had been no maxilla but only the mandible present.

**Mr. Trevor Johnson** said that in the last two weeks he had had one case which might be of interest to the meeting. The case was that of a boy now aged 10 years, the youngest of four children whose teeth he had watched for several years and none of whom had had much caries. He saw the children regularly three times a year. They had been brought up to chew well. The last time he had seen



the boy in question was during the recent summer holidays, when the right lower D and E were about a millimetre below the occlusion level. He was sure that had not been the case when he saw the boy during the Easter holidays.

**Mr. O. N. Catchpole**, after thanking Mr. Capon for his carefully thought out and very well collated paper, said that he had been treating a child who had all the deciduous molars and the permanent molars out of occlusion. He had taken out the deciduous teeth.

**Mr. Capon**, in replying to the discussion, agreed with Mr. Chapman that the abnormality in question was not as great as it was often supposed to be. He would welcome any models that were sent to him with the histories of the cases.

He had mentioned the tongue in only one case that he had shown, and that had nothing to do with the problem; it was only in passing that he had mentioned it. In other cases in which he had thought the tongue pressure might interfere, that had not been the case.

Several of the speakers in the discussion had referred to the fact that their cases had been comparatively free from dental caries. He could not say whether that was a coincidence or not.

He would like to see the case to which Mr. Watkin had referred. He had been wondering whether the condition was not an over-development of the incisor region rather than an arrested development of the molar region. If one imagined that the mouth was divided into blocks—the incisor block, the premolar block and the molar block—it always seemed to him that the molar block did not grow enough or that the incisor block grew too much. He had shown a case in which the six-year-old molars had been apart at the same time as the deciduous molars, yet he had had to put in a plate to stop the child irritating the palate with the lower incisors.

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# Some Practical Aspects of Thumb Sucking

By T. JASON WOOD, B.Ch.D., L.D.S.Eng.

I feel highly honoured at being asked to give a communication to this Society. I hope you will not find it too commonplace. It may serve, at any rate, as a basis for discussion.

In "thumb sucking" I include all sucking habits, such as sucking of the lip, finger, sheet, teddy bear, and so on. I think it may be useful if I mention the main deformities produced by these habits. In the maxilla they are infraplacement of the anterior teeth caused by upward pressure, and labioclination of the anterior teeth and secondary lateral compression of the cheek teeth caused by forward pressure. In the mandible we have infraplacement of the anterior teeth caused by downward pressure, and linguoclination of the anterior teeth and postnormality of the mandible caused by backward pressure. All these deformities may occur either separately or in combination, and they may be unilateral or bilateral. Lateral displacement of the mandible may also occur.

With regard to treatment, the most important and often the only step required is to break the habit. To be successful in this it is necessary to obtain the full co-operation of both parent and child. I consider the personal approach to the child to be extremely important, and I usually set about it in the following way. I appeal to the self-importance of the child to begin with, by some such remark as this: "Well, now, you are a big boy of five, and it is only babies of two who suck their thumbs. I want you to try very hard to stop this babyish habit." I ask the mother to make some sort of mitt of a coarse material, such as hessian, to be fastened firmly to the child's wrist, and I explain to the child that this is not to make him do anything but only to remind him not to put his thumb in his mouth. I think it is psychologically sound to give the child some positive instruction and not always to be saying "Don't," so I suggest to the child quite seriously that if he finds his thumb has got into his mouth he should take it out quickly, smack it and sit on it or put it in his pocket or under his pillow. I also point out to the child (this is the only threat that I think is at all useful) that if he goes on sucking his thumb he may grow to look like a codfish. In one case the child and his mother listened to my exhortation and the mother seemed to be impressed, and after they left she said to the child: "Now, Adrian, I want you to stop sucking your thumb. Try your hardest. You would not like to grow up to look like Uncle Richard, would you?" Adrian was not very impressed, but a couple of weeks later Uncle Richard came to stay, and from that day onwards, the mother reported, the thumb never went back again.

In the following case my exhortation was a complete failure. It is the case of a very bright little girl of  $5\frac{1}{2}$  who had good normal occlusion, except for slight labioclination of the upper incisors. I felt quite certain that if the thumb sucking stopped the habit would in no way endanger the permanent dentition. I gave the child the usual exhortation and she agreed with everything I said and said that she would do what she could about it. At several subsequent visits, however, when I asked: "Have you stopped sucking your thumb?" she replied: "No" and smiled sweetly. Later I found out that the thumb sucking was a means of attracting attention. The child had also at one time developed squinting and stammering. Her



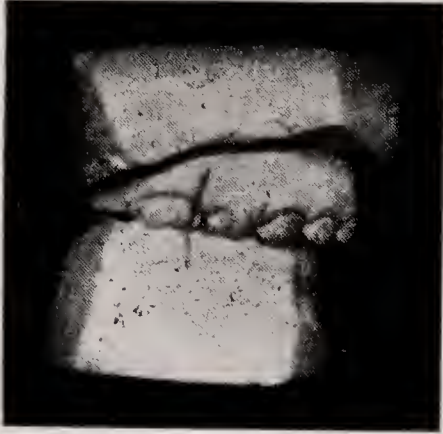


Fig. 1.

5yrs. 6mths.

mother is an intelligent woman, and we decided to make no further mention of the thumb sucking, but I fitted a Badcock plate with a small labial wire, explaining to the child that this was to "straighten her teeth." She was greatly pleased with it. The habit stopped very quickly and the plate was abandoned in three months, and the child was heard to remark: "My thumb won't suck any more." In most cases where it has been necessary, because of the deformity produced by the habit, to fit some sort of apparatus, I have found that the habit has very quickly ceased.

Fig. 2.



8yrs. 9mths.

9yrs. 3mths.

This slide shows anterior open bite due to infraplacement of the upper incisors. The models show the condition at the age of 8 years 9 months and 9 years 3 months respectively. The usual talk was given and the child stopped thumb sucking in three days. No apparatus was used except the mitt, and the condition considerably improved in six months. The approximation of the lips was good. The only teeth really affected were the upper four front teeth.

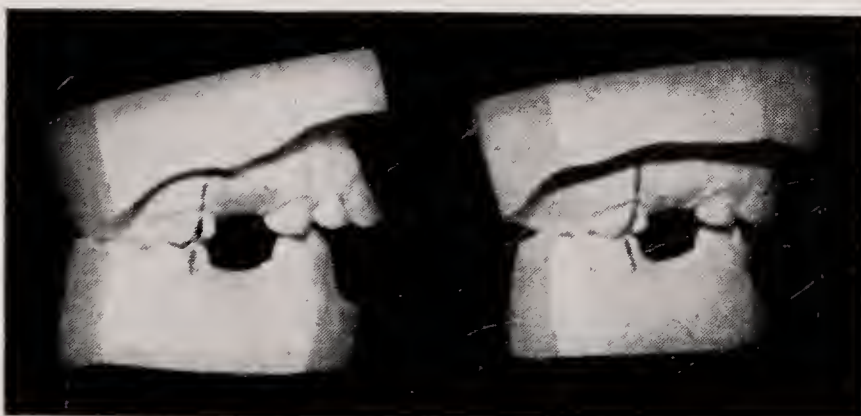


Fig. 3.

9yrs. 3mths.

9yrs. 8mths.

This is a simple case of labioclination of the upper incisors, which were spaced. The rest of the teeth were apparently unaffected by the habit. The lips were in bad relationship, there being no sealing at all at rest. The condition was treated with an apparatus—a small vulcanite plate with a high labial wire and a stainless steel apron spring. The models show the condition at the age of 9 years 3 months and 9 years 8 months respectively. During the five months normal incisor relationship and normal lip relationship were obtained.

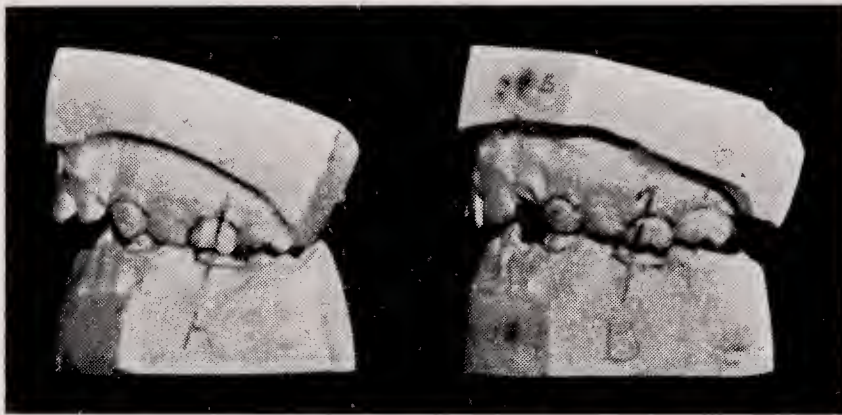


Fig. 4.

(Left) 5yrs. 11mths.

7yrs. 7mths.

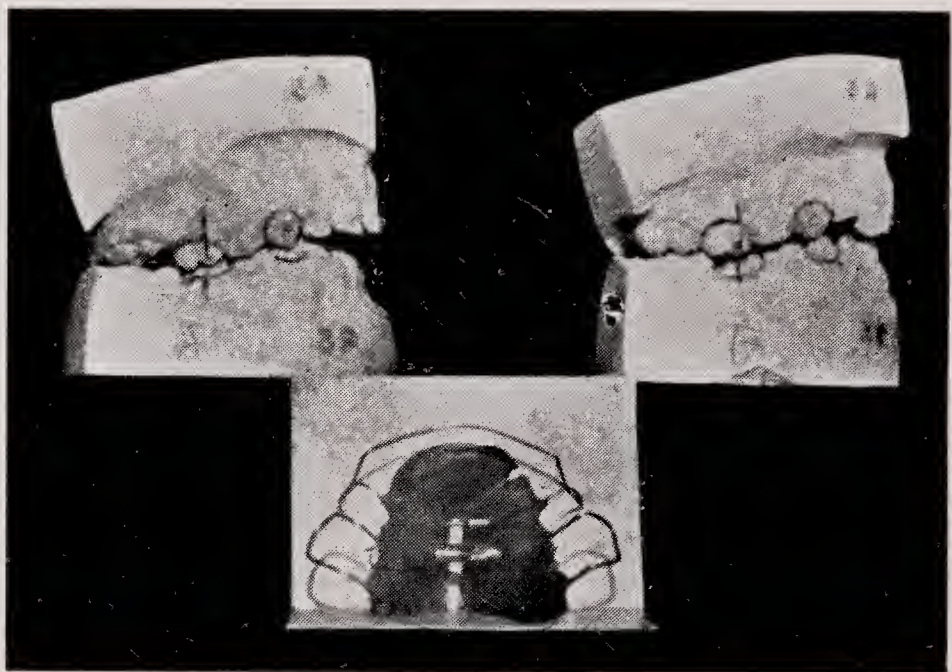


Fig. 5.

(Right) 5yrs. 11mths.

7yrs. 7mths.

This case I consider typical of what I call the complicated thumb sucking deformity. The left side shows the postnormality and I think it also shows a slight linguoclination of the lower incisors. There is very marked labioclination of the upper incisors. The right side was normal. The slide shows the models at the age of 5 years 11 months and 7 years 7 months respectively; at the latter age the condition had been restored to normal. The apparatus used was extremely simple, being a Badcock plate cut through in the canine region on the postnormal side, the object of that being to try to throw the main amount of expansion on to the postnormal side and so encourage the jaw to come forward more on that side than on the other. The plate carried a light labial arch with canine loops, to control the labioclination of the upper incisors. When the plate had been worn for about six or nine months I thickened the palate anteriorly into a very deep and sharp inclined plane. I explained to the patient when I started treating him that he had pushed his lower jaw back with his thumb, and I showed him how he had done it. I said to him: "I want you to correct that condition as far as you possibly can, and this plate is to remind you to do that. The





Fig. 6.

6yrs. 5mths.

8yrs. 1mth.

inclined plane is to act as a reminder to you to bite forward in the normal position."

The models in this case were taken at the age of 6 years 5 months and 8 years 1 month. There was a marked postnormality and there was a definite labioclination on the one side. The condition was corrected with a simple removable apparatus. The lip relationship was bad, and I instituted lip exercises.

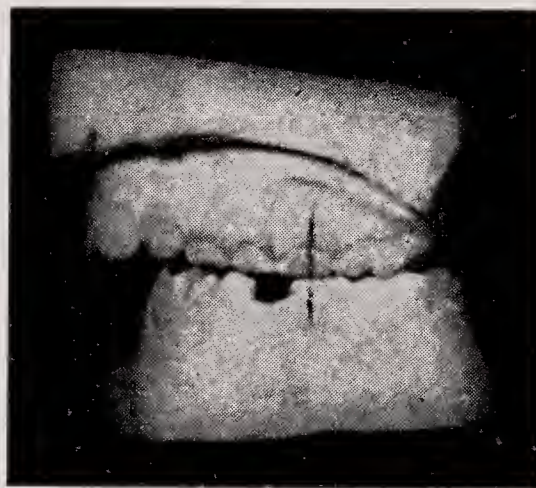


Fig. 7.

8yrs. 9mths.

The models in this case were taken at the age of 8 years 9 months. The boy was a confirmed lip sucker. He had a marked postnormality, linguoclination of the lower incisors and also a distal drift of the lower incisors and the canines, partly due to an early loss of both D's. There was also marked labioclination in the upper incisor region. I am sorry that I have no second models in this case. I am treating him at the present time with intermaxillary traction. After four months the antero-posterior relationship, the lips and upper incisors were normal, and all the lower incisors except one in the normal position. The difference in the appearance of the boy in such a short time is very remarkable. I think the reason why the jaw has come back into the correct position so quickly is that it had only been pushed back by the thumb.



Fig. 8.

3yrs. 8mths

7yrs. 11mths.

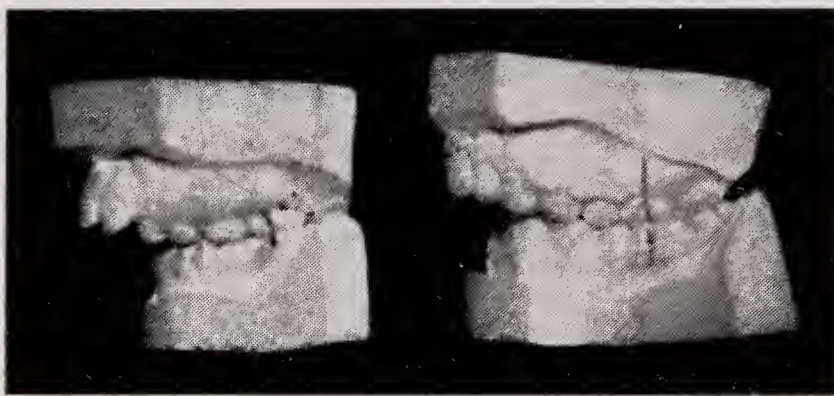
6yrs. 2mths.

The first models shown on this slide are those of a girl aged 3 years 8 months. She was class II, division 1, with a very definite thumb-sucking habit superimposed. She is a difficult patient, but fortunately she has a good nurse. We managed to break the thumb-sucking habit completely. The lips have been much improved through the use of a lip exercisor, and I hope to put on intermaxillary traction as soon as the child is a little more amenable to treatment.

The second models on the slide are those of a girl aged 7 years 11 months who had moved the mandible to the left side. She was in the habit of sucking the first two fingers of the right hand and tickling her nose with some fluff pulled off the blanket and held in her left hand. I am treating her with a Badcock expansion plate.

The third models on the slide are those of a girl aged 6 years 2 months. As far as I can see, the case is normal, although the child is a keen thumb sucker, and I think such a condition is comparatively rare. I should expect a keen thumb sucker at the age of 6 years 2 months to show a definite deformity.

Fig. 9.



10yrs. 9mths.

15yrs. 6mths.

This slide shows two hospital cases, aged 10 years 9 months and 15 years 6 months. They are untreated cases of thumb sucking. The belief that thumb sucking is a comparatively harmless pastime is somewhat widely held in the dental profession, and I think these models indicate the reverse.

There seems to me to be some relation between the condition of postnormal thumb suckers and class II, division 2, because in both cases if the upper jaw is expanded and the obstacle removed the lower jaw is very likely to come forward without intermaxillary traction. In the case of thumb suckers the obstacle is the thumb, and in the case of class II, division 2, patients the obstacle is the instanding position of the upper central incisors.

## DISCUSSION

**Dr. S. Friel** congratulated Mr. Wood on his method of dealing with thumb suckers, which was very much better, he thought, than trying to coerce the children, which was the method adopted by many people. He did not approve, however, of tying a mitt on to the child's wrist. In his opinion, a much better plan was to give the children something which they could put on themselves and could take off themselves if they wished to do so. His own practice was to make a collar to go round the elbow, which he gave to the child and said: "Put that on at night time. It is just to remind you when you feel a pressure that your thumb cannot go into your mouth. You can take it off if you do not like it." In 99 per cent of his cases he found that that was successful.

He first saw the child and talked to it alone, and then he saw the mother and asked her to try to get the child to sleep quickly on the first three nights. Occasionally one came across children who



would not do anything they were asked to do. During the recent summer holidays he had seen a little boy of 6 years who was a thumb sucker, and he had talked to him and asked him to send him a postcard in a fortnight's time saying that he had stopped sucking his thumb. The child sent him the postcard, but said on it that he had sucked his thumb. The boy's sister, aged 4, also sucked her thumb, and when he asked her: "Have you stopped sucking your thumb?" she replied: "I won't." He could not persuade her to do anything. He thought it was hopeless to try to make a child of 4 years, who adopted that attitude, stop sucking her thumb, and he would rather wait for a couple of years and then try again than use coercion, which he thought was wrong. In the case of older children one could put in an apparatus that cut across the tongue, leaving a complete gap between the anterior portion of the tongue and the bar. That was very uncomfortable when the child tried to suck its thumb and sometimes it proved successful in stopping the habit. It could be put in as an apparatus for expansion.

He wished to congratulate Mr. Wood on not using coercion. He remembered an excellent paper which had been written on thumb-sucking and other similar habits, but the reader of the paper showed a card on which was written: "I promise that I will not suck my thumb," and which was signed by the child. He thought a child might be asked to promise that he would do his best to stop sucking his thumb but he certainly should not be asked to promise not to do so.

**Captain Goldstein (U.S.A.)** said that if thumb sucking or any similar habit seemed to be the cause of malocclusion dental surgeons in the United States would certainly try to break the habit before completing their treatment of the case, and there were a number of ways in which the habit could be broken. Frequently mothers brought their children to a dental surgeon at the age of about  $2\frac{1}{2}$  years, having tried arm splints and other methods of curing thumb sucking but without success. It was very difficult to explain anything to a child of that age, and often the best plan was to use an apparatus consisting of a bar a little distance away from the palate and curving with the palate, with two spurs on it. He had himself made at least fifty for various children and had never known one of them to fail, whilst in some cases they were successful in breaking the habit in one night. Lip sucking was just as dangerous as thumb sucking and it could be treated by means of a similar apparatus, the spurs being made to come down straight towards the lip so that the child could not suck his lip. The spurs must not be too sharp. Wool mittens were successful in some cases. With regard to thumb sucking on the part of older children, he had in mind two boys who both knew they were thumb sucking and wanted to break the habit, and their mother said that they tried their best to do so but that it seemed like smoking in the case of some people—it seemed impossible for them to stop the habit. In such cases an apparatus which prevented the thumb sucking would finally correct the habit.

He had enjoyed Mr. Wood's paper very much.

**Mr. R. Cutler** said he thought that dental surgeons should not be unmindful of the cause of many cases of thumb sucking and other such habits. Work by Freud, MacDougal and others on the secondary sexual areas of stimulation pointed to the palate as being one of those areas, and he was very doubtful of the extent to which it was right to elaborate on the nature of the habit to the parent or the child, for that might drive the impulse underground and produce an infantile perversion of a serious character. In view of that theory, it was quite clear that anything which insulated the palate from the stimulating action of the tongue should break the habit, and that was in fact the case. It was only necessary to put on an orthodontic appliance which insulated the palate from the

stimulating effect of the tongue for the habit to be broken, sometimes, as had already been said, in one night. A fixed lingual appliance having a "barricade" in front which performed the same purpose was equally successful.

One of the most interesting deformities, he thought, was that caused by the sucking of the tip of the tongue, which was not so obvious as the sucking of the thumb but was characterised by a very marked partial open bite. In at least two cases of a very marked partial open bite, of which he had models, he had cured the condition completely by means of a simple lingual fixed appliance with a barricade, no other treatment having been necessary.

He agreed with Dr. Friel in being disinclined to bully the child or even to elaborate the nature of the habit to the parent or go into it at all seriously, because mechanical methods, on the principle of insulation of the area, were so successful. He was not, of course, referring to the more complicated technical cases which Mr. Wood had discussed.

**Mr. Carter** said he agreed with Mr. Wood's attitude to the child but disagreed with his attitude to the parent, because he had frequently found that a nagging parent made it more difficult for the child to stop thumb sucking or any similar habit. His own practice was to tell the parent to say nothing to the child about the habit between the child's visits to him. He talked to the child in simple language, as did Mr. Wood, and he found that to be successful. He had known it to fail in only three cases in the last two years, and those three cases were obviously children who should have been referred to a child psychologist, their attitude being so abnormal.

He did not like appliances or anything that forcibly prevented the child indulging in the habit, because he felt that it might produce some other sexual habit.

He did not agree with Mr. Wood in thinking that the habit pushed the jaw back or prevented the whole jaw from developing. He thought the result of the habit was to prevent the normal forward development of the mandibular dentition in relation to the maxillary dentition. Similarly, the condition in class II, division 2, was not due, he thought, to the retroclination of the incisors, which was only part of the postnormality; it was due to a forward movement of the mandibular dentition because of the excessive overlap of the upper incisors in relation to the lower incisors.

**Mr. H. G. Watkin** said there were many cases in which thumb sucking did no harm. Whether it did harm or not depended on the extent to which, and the force with which, the thumb was sucked. If a child put his thumb into his mouth for a few minutes before he went to sleep, no harm was done. If he sucked it all day and sucked it forcibly, there was no doubt that damage would ensue.

He was in favour of anything that would destroy the pleasure of thumb sucking, as anything that destroyed the pleasure of the habit would cure it.

With regard to the case shown by Mr. Wood in which the upper left molars were in lingual occlusion with the lower, that condition was very often caused by the child leaning his head on his left fist when writing. The pressure on the teeth pushed them right in and caused lingual occlusion on the left side. With left-handed children the lingual occlusion occurred on the right side.

**Mr. Jason Wood**, in replying to the discussion, said he had not had any experience of the use of the mouth screen. He agreed with Dr. Friel in being opposed to the use of coercion; he himself had never used it, and he did not think it was any good at all. As in all orthodontic cases, treatment was never successful without the co-operation of the child. If a child did not want to have his teeth



made straight, nothing that the orthodontist could do would be successful.

Personally he would not trouble about thumb sucking at the age of  $2\frac{1}{2}$ ; he would not regard it as pathological before the age of 8 years.

He thought that almost any appliance which had anything to do with the palate at all would stop the habit of thumb sucking.

With regard to the aetiology, he had not referred to that subject as he did not feel that anyone of his years and experience could deal with it at such a meeting as the present one. Much ætiology in orthodontics was guesswork and a good deal of it was not of very much use from the practical point of view. He did not wish, however, to belittle the importance of it.

His own view was that thumb sucking was a pathological continuation of the habit of breast sucking or was associated with nail biting, bed wetting and eczema, and the type of child who did such things. He did not think that such things were of very much importance from the practical point of view.

He had always taken the parent into his confidence, but so far he had been fortunate in having reasonable parents to deal with. He knew that some women were quite useless in the matter, and if he had to deal with one of them he would certainly not take her into his confidence.

He did not agree that postnormality was a question of under-development. He thought the case he had shown of unilateral post-normality, with normal occlusion on one side, refuted that suggestion. The ease and speed with which the condition had been cured surely indicated that there was no question of under-development.

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# Treatment of Class II Division I Cases

By O. N. CATCHPOLE, L.D.S.Eng.

I treat suitable cases by extracting the upper lateral incisors and retracting the centrals, when treatment over three years with inter-maxillary traction is impracticable. Suitability and indications for this treatment include :—

That no ugly gaps remain at completion of treatment, so the cases are usually those in which the jaws are too small for the teeth.

That there is no hindrance to the lingual movement of the upper central incisors, e.g., occlusion of the power teeth.

The movement of the teeth is usually completed with gentle pressure in six months. This is followed by retention with the same appliance worn always for six months, and then worn at night only : for night wear an oral screen may replace the plate.

It is possible that the prognosis for the retention of  $\overline{1} | \overline{1}$  is better if  $\underline{2} | \underline{2}$  are extracted than if  $\underline{4} | \underline{4}$  are extracted and  $\underline{321} | \underline{123}$  retracted.

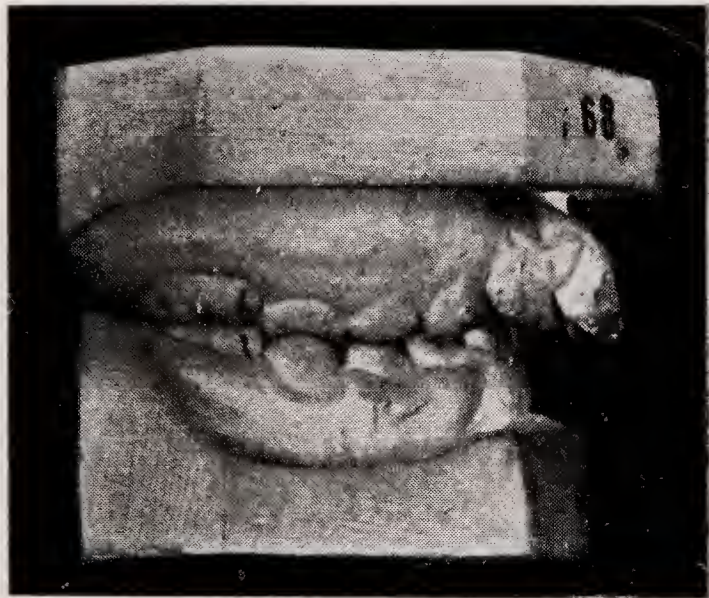


Fig. 1.



Fig. 2.

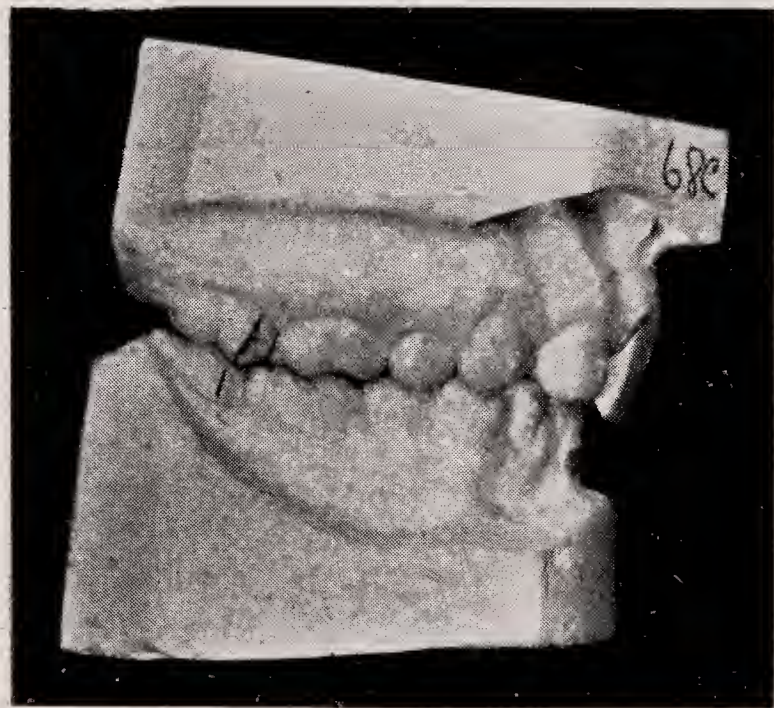


Fig. 3.



Fig. 4.

Case No. 68. Age 9 years 10 months (girl). (See Figs. 1 to 4.)

Age 9 years 11 months. Plate fitted,  $\underline{2} | \underline{2}$  extracted. Badcock plate with inclined plane and looped labial wire and auxiliary spring to retract  $\overline{1} | \overline{1}$ . The auxiliary spring is gauge 25, fastened at one end and coiling round the labial bow at the other to slide on it. If



the upper centrals are in proclination, cleats should engage their incisal edges to prevent elongation.

Age 10 years 6 months. Upper centrals correct. Lips are now kept closed. New plate for retention.

Age 11 years 3 months. Plate discarded and retention continued for another year with an oral screen.

Age 17 years. Models. The cusps of the canines have been flattened. The general appearance is good. The spaces between the four upper anterior teeth, though they may not enhance the appearance, help in preventing interstitial caries.

At first it was not anticipated that the plate could be discarded within a year, so therefore a Badcock screw was used so that expansion could be made to keep the width of the plate synchronised with the growth of the palate. Further experience showed that this was unnecessary.



Fig. 5.



Fig. 6.

Case No. 183. Age 11 years 1 month (boy). (See Figs. 5 and 6.)

Age 11 years 1 month. This case is shown because it is one which is particularly suitable for this type of treatment. I am unable to show you the result as it has only recently been commenced, but it is going well. As you see, there is hardly enough room for the two laterals, and the likelihood of there being unsightly gaps when it is finished is small.



## SHORT COMMUNICATIONS

Delivered before the Society, September 7th, 1942,

### A CURE OF THUMB-SUCKING WITH MARKED CHANGES IN OCCLUSION

By Miss K. C. SMYTH, L.D.S.Eng.

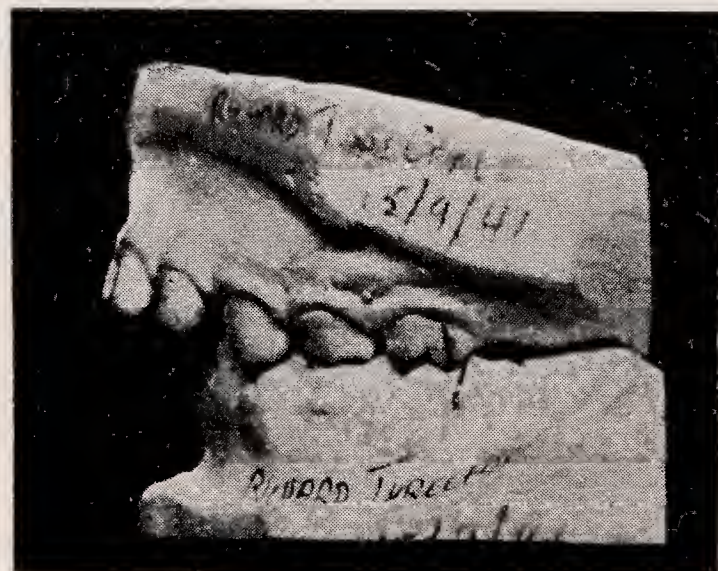
This boy, a son of a dental surgeon, was brought to me for advice as to how to cure his persistent thumb-sucking. The protrusion was very marked, and the habit well established.

As the deciduous incisors were quite firm, I decided to treat the deformity of the upper arch by means of a removable appliance, which I hoped would at the same time stop the thumb-sucking.

The appliance used was an ordinary vulcanite plate, cut away behind the four incisors sufficiently to allow for retraction, and a continuous labial wire with loops for adjustment. A Badcock expansion screw was also incorporated, as the upper arch was narrow. It was holding back the lower arch because of the reduced width between the upper canines.

The wearing of the plate stopped the sucking habit at once. Presumably there is no satisfaction in putting the thumb in, if there is no pressure felt on the palate. The presence of the Badcock screw was probably an additional deterrent.

The expansion was continued slowly and steadily until the screw was almost fully extended. Towards the end, the plate began to slide about loosely, but was always worn. At this stage the screw was turned back till the plate fitted firmly, and worn like that for retention



Figs. 1 and 2.



until about a month ago, when it was discarded, experimentally, to see if there is any tendency to return to the habit. The second models were taken about this time.

Some months ago the father reported to me that he thought the boy's mandible was coming forward, and when I saw him recently, there was no doubt of this. He now has a better and more comfortable occlusion in the normal forward position, and seems to tend more and more to use this bite, although he can still bite further back if asked to do so.

The incisors are now loose—one permanent incisor is erupted—and I am proposing to leave the boy without an appliance at any rate during the change of incisors, hoping that there will be no recurrence of thumb-sucking, or relapse of occlusion. The lips are now closed normally.

Figs. 1 and 2 show the condition before and after the use of the upper apparatus.

#### DISCUSSION.

**Mr. C. F. Ballard** said that in his experience the habit could be cured in roughly 90 per cent of cases by having one or two quiet and private talks with the child. If the child were of very unusual temperament then probably the best course was to refer it to a child guidance clinic or a child psychologist because forceful attempts to cure the habit did not improve the psychosthenia, in fact they might make the child worse.

**Mr. W. A. S. Hills** said that this method of treatment was interesting, but put forward the suggestion that at early ages such as this one no treatment which tended to keep the mouth open and so induce mouth-breathing should be put into operation. It should be our aim, when treating young children, to see that the mouth is closed so that normal growth and development could continue.

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### A CASE OF ROTATED INCISORS

By O. N. CATCHPOLE, L.D.S.Eng.

THE patient was first seen at the age of  $7\frac{1}{2}$ . The two centrals were about a quarter erupted, with the distal corners rotated outwards, overlapping the laterals, and with their long axis directed upwards and mesially. There was a gap between them. To see whether they were going to improve of their own accord, the case was left for six months; during that period the centrals erupted further and improved considerably. It was decided still to leave them without treatment. Three years after the original models, the centrals were in good position, having corrected themselves entirely without any treatment. The one possible feature about the case was that the two upper laterals were erupted before the centrals. The reason I bring the case is that I did not anticipate that they could be corrected without treatment.

Three pairs of models were shown.

#### DISCUSSION.

Mr. RUSSELL MARSH thanked Mr. Catchpole for his communication and said that in his opinion the rotation of incisors, even of lateral incisors, was often due to pressure of the crown of the unerupted canine tooth upon the roots of the lateral incisors. The pressure tends to be relieved as the canine tooth erupts, and it was sometimes unwise to put any great strain upon the rotated teeth in an effort to correct them until after the eruption of the canines.

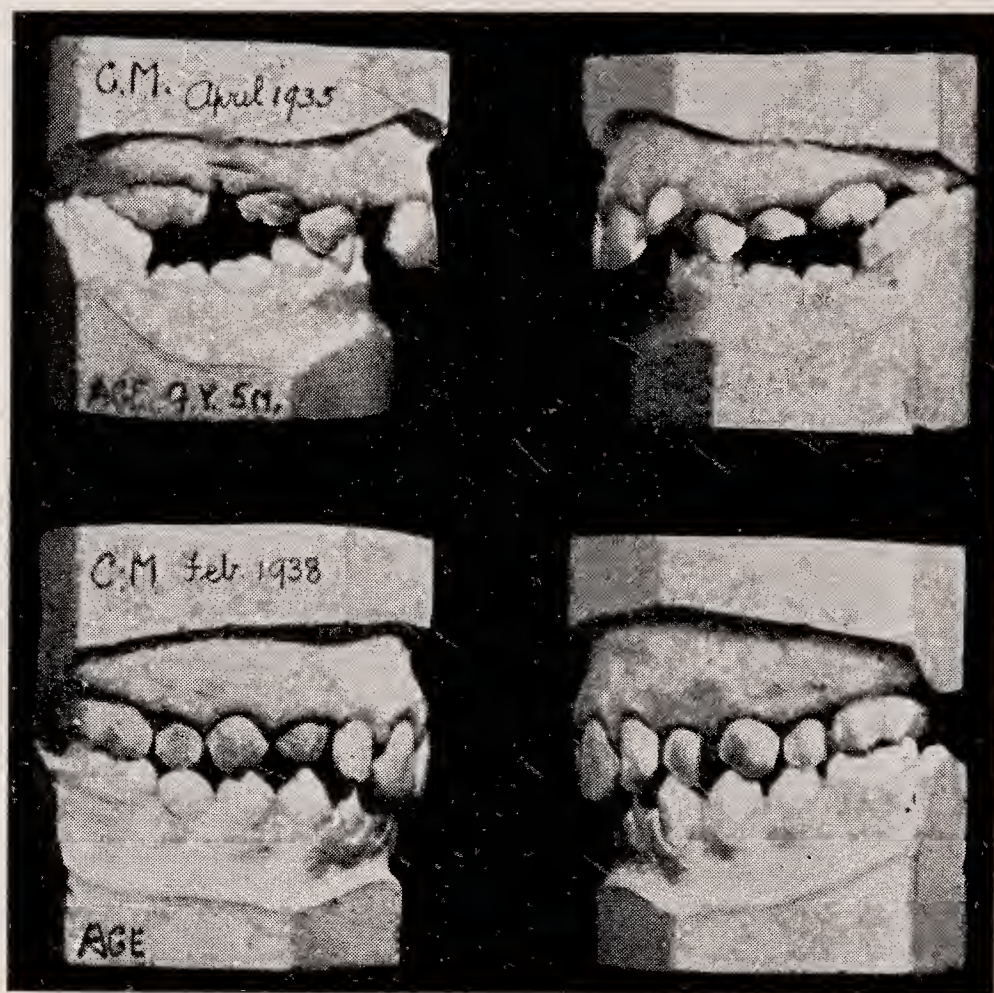


## AN UNSUCCESSFUL ATTEMPT TO MOVE "DEPRESSED" DECIDUOUS MOLARS

By H. C. VISICK, L.D.S.Eng.

Two brothers, both of whom had "depressed" deciduous molars, are under discussion.

The elder brother's deciduous molars were extracted and the permanent teeth erupted into occlusion quite normally. The younger brother's lower arch was narrow and I attempted to widen it with a lingual arch using the first permanent molars as anchor teeth. Stainless steel spring wires of 4mm. diameter produced no movement whatever. I then decided to use more force and applied pressure with a 7 mm. wire on the second deciduous molars. These teeth were tilted lingually so the springs pressing on the sloping lingual surfaces should have moved the teeth upward as well as outward. After another 7 months these teeth were still in the same position but the permanent anchor teeth had been unequal to the contest, and had been pushed down into their sockets at least 2 mm.



**Fig. 1.**  
**Models of elder brother whose depressed deciduous molars were extracted.**

I have models and X-ray photos taken 9 months later which show that the space between the upper and lower deciduous molars has more than doubled. In other words the "depression" has progressed.

These facts, coupled with similar experience in other cases, lead me to the conclusion that so called "depressed" teeth are ankylosed to the jaw. This anchorage prevents the tooth from rising with the tide of bone growth, giving it a submerged appearance, characteristic of these cases.

The fact that this phenomenon of "depression" is only found in deciduous teeth and that the succeeding permanent teeth easily pass through what has appeared to be inert bone—shows that we must look for the cause, not in the bone, but in the deciduous teeth themselves.

In what way do the deciduous teeth differ from the permanent





Fig 2.

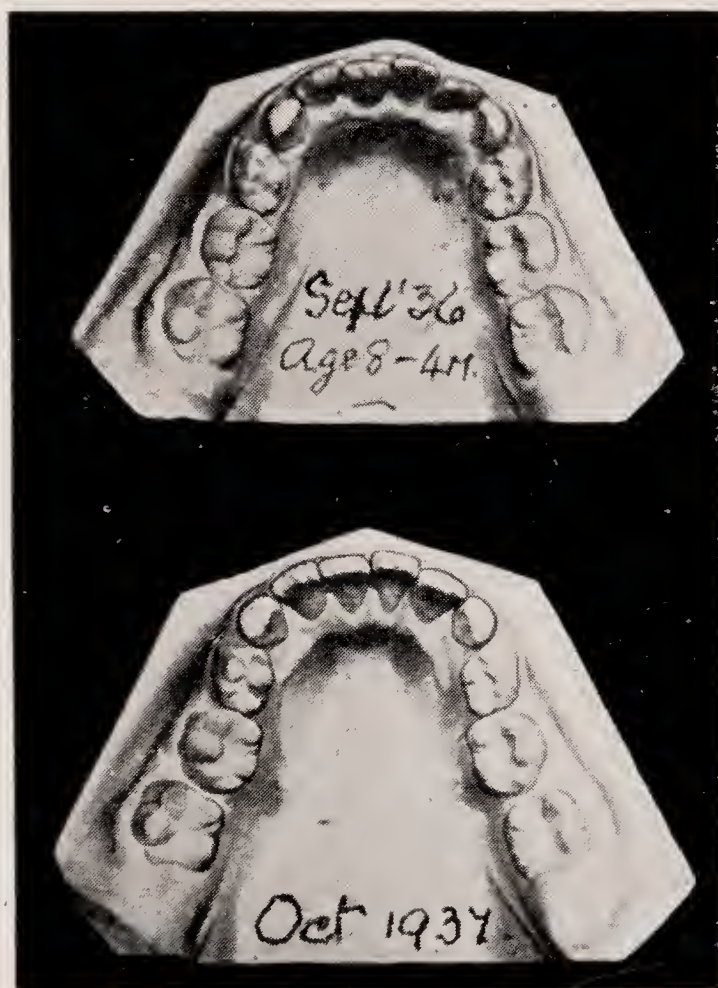


Fig. 3

Figs. 2 and 3.  
Models of younger brother, the position of whose lower deciduous molars shows no improvement with apparatus.



dentition? The most significant peculiarity of the deciduous dentition is the absorption of the roots. This absorption we are told alternates with periods of deposition of bone, and it seems feasible to suggest that some upset to the balance of the process may produce an ankylosis.



Fig. 4.  
Radiographs of younger brother 14 months after original models were obtained showing persistence of the condition.

It has been thought that the movement of teeth during orthodontic treatment is partly due to the bending of the alveolus. If bone can bend, how is it that seven months' strong pressure produced no movement? I suggest that any movement of teeth is dependent on the presence of the peridontal membrane.

I am indebted to Mr. H. G. Watkin for the history and models of the elder brother's case; and to Dr. Fish for the final models and X-ray photographs of the younger brother.

#### DISCUSSION.

Mr. O. N. CATCHPOLE said that he had noticed that these depressed deciduous molars were particularly difficult to extract. They formed the nearest approach to ankylosed teeth that he had met.

Miss K. C. SMYTH referred to a communication given to the Society previously by Mr. B. Bane. He showed the case of a boy of about 15 years, healthy and well developed, whose *permanent* cheek teeth, though all erupted, had failed to come into occlusion. The incisors were the only teeth able to occlude.



## DEMONSTRATIONS, 1943

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The following is a résumé of each demonstration.

Mr. HAROLD CHAPMAN, L.D.S.Eng.

Mr. Harold Chapman showed a number of cases, in which permanent upper molars and premolars were in buccal occlusion to the lower teeth, or permanent upper molars were in lingual occlusion to the lower teeth, treated by removable and fixed appliances. Not all responded equally well to treatment and it seems that if the bite is opened, the prognosis is improved. Upper molars seemed to respond better to buccal movement than to lingual movement and with fixed appliances than with removable ones though comparison is difficult with the limited number of cases and their variation.

He also showed rotation of molars by means of auxiliary springs, on the buccal or lingual arch. The arch is attached by a round vertical rod in a round vertical tube on a band on the tooth to be rotated: the spring acts on the same surface of the tooth as that to which the tube is attached but at the opposite corner, which is built out a trifle to increase the efficiency of the appliance.

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### REGULATION OF INSTANDING UPPER INCISORS

Mr. O. N. CATCHPOLE, L.D.S.Eng.

Models were shown of cases of instanding upper incisors treated by removable apparatus; intermaxillary traction was not used, but one case was probably a true Class III.

Treatment was by:—

- (a) Upper plates with auxiliary springs to move the instanding tooth labially, or
  - (b) Metal inclined plane cemented to the lower anterior teeth, or
  - (c) A wooden tongue spatula cut to a length of  $1\frac{1}{2}'' \times \frac{1}{4}''$  wide, used by the child to press out the instanding tooth, the lower incisors being used as a fulcrum. Two cases were shown.
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### THE APPLICATION OF SIMPLE SPRINGS

Mr. K. E. PRINGLE, L.D.S.Eng.

Mr. Pringle, with the help of Mr. J. R. Dimock, showed the following stainless steel auxiliary springs:—

- (1) Self-straightening spring attached to a buccal bow for the alignment of one or two teeth (this is a modification of Jackson's spring as shown by Mr. Cale Matthews to the Society).
- (2) Self-straightening spring with free attachment to buccal bow used in conjunction with hook on band on partially erupted tooth to aid eruption.
- (3) Canine retraction spring attached to buccal bow.
- (4) Reciprocal action spring with free attachment to buccal bow to bring upper centrals together.
- (5) Flap spring attached to low lower lingual bow for pushing forward lower incisors.

In each case the bows were made of 0.8mm. stainless steel wire and the springs of 0.3mm. stainless steel wire. The springs were attached to the bows by winding.

Mr. Dimock showed a method of attaching 0.5mm. wire to 0.8mm. wire by means of oval tubing.

Miss LILAH CLINCH, L.D.S.Irel.

An electric welder (designed by Professor Friel) and the attachment of auxiliary springs.

The method of attaching springs to the framework with stainless steel strip is a modification of that described by McKeag (Friel and McKeag Trans. E.O.S., 1938). The spring wire is coiled round the arch twice on each side of the strip which joins it to the arch; the thin spring wire is not welded and the strip is not affected by welding.

The strip used is 1.5mm.  $\times$  .08mm. (unpolished, soft metal).

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## PLATES WORN AT NIGHT ONLY

WILLIAM TREVOR JOHNSON, L.D.S.Eng.

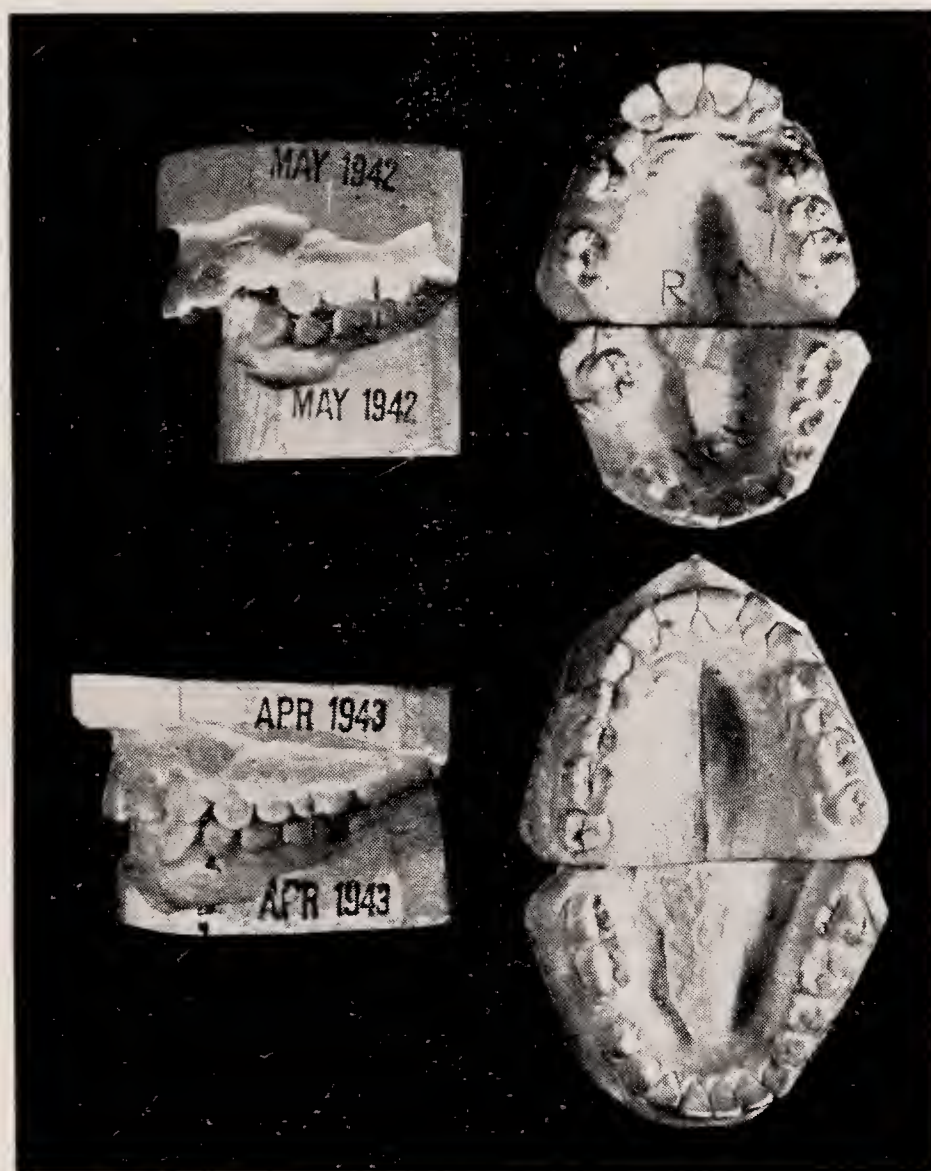
A number of cases of Angles Class II, div. 1, have been treated by variation of the method described by Rudolf Grude in his paper "The Norwegian System of Orthodontic Treatment" and some of them promise good results. The plates are worn at night only, with no intermaxillary elastics. There is evidence that if the patient maintains pressure and keeps the appliance firmly in position, widening of the upper arch and medial movement of the mandible take place. If the pressure is not maintained or is intermittent the result is not so good, and in some cases of the open mouth type the plate is ejected in the night, and the method for these is unsatisfactory. The mandible is maintained in a medial position for a period which may be up to twelve hours each day, and it is reasonable to suppose that this is an influence which might bring about the changes necessary for medial movement of the mandible to take place. The method may prove on continued experiment to give good results only in certain favourable cases, but its possibilities should still be investigated. From the point of view of the health of the dental tissues, and the general well-being of the patient, there can be no doubt that a plate worn at night only is preferable to one worn continuously, and it is, in fact, very noticeable that the gingiva is unusually hard and firm, while these plates are being worn.

Original and final models are shown of Bristol Dental Hospital Case No. 404, which are of a female at ages of 11 and 12. The post-normality is one cusp, and the lower incisors occlude with the mucosa about 3mm. behind the upper central incisors. There is insufficient space for the lower right premolars by 3mm. The upper incisors are inclined labially, and are slightly spaced. It will be seen from the second models that the arch relationship and the inclination of the upper incisors are now normal, and the lower incisors occlude with the upper incisors about 3mm. from the gum edge. There is insufficient space for the second right premolars to erupt by 3mm., and the distal surfaces of the upper and lower right second premolars are in the same vertical plane. The centre of the lower is 2mm. to the right and the upper arch is slightly too wide for the lower. The appliance is still being worn.

In making the appliance plaster impressions are found to be most satisfactory, and to obtain a bite a base plate is made to the upper model covering the palate and the occlusal surfaces of all the teeth. A bite is required with the mandible well forward and the writer aims at a position slightly in excess of that which seems necessary for correction. Some children will give this bite very readily, but often difficulty is found and then the models are orientated experimentally by adding a roll of heated Paribar about  $\frac{1}{4}$  inch in diameter to the bite plate in the molar and premolar regions, and whilst this is still warm the models are occluded experimentally. This is cooled and tried in the mouth, and if it serves to guide the patient in the desired position of occlusion, the composition of the base plate on one side is superheated, and inserted in the mouth for correction



and then cooled. This is repeated on the other side. The bite is gagged at least enough to allow a piece of 1mm. wire to pass at right angles to and between the upper and lower incisors. The models are mounted on an articulator, and height of the bite fixed by the screw. The term "Monoblock" has been suggested as descriptive of the appliance, and will be used. To the upper model a high labial arch is formed in two halves to allow for widening, and this provides a framework for the pivoting arm and spring to move the upper incisors lingually. The framework and Badcock



screw are waxed to the model and the pivoting arm is best formed at this stage, and attached with the spring after processing, and an area must be boxed in with plaster to allow of this lingual movement of the upper incisors. On the lower model thin tin should be burnished to cover the tips of the lower incisors, their lingual surfaces, and the gum to  $\frac{1}{8}$  inch below the gum edge. If the lower incisors are to be moved labially or depressed this movement is effected by pressure applied to the lingual surface of the lower incisors by two separate square cornered "U" springs of 0.3mm. wire for the right and left. Both ends of the spring are waxed to the model, and boxed in with plaster, leaving the incisal half of the teeth uncovered. Plaster should also be used to fill in the grooves and sulci on the occlusal surfaces of the lower teeth making the surface flat and level with the cusps, and also to fill in any spaces where teeth are still to erupt on both models. Further, with close bite the teeth most likely to "over-erupt" and improve the condition should be either left uncovered or space provided by boxing with plaster. Thin tin should now be burnished over the area corresponding to the cheek teeth on the lower model. The building of the wax pattern of the body of the appliance is best done by dealing with the upper and lower models separately. In the upper the wax is to cover the

palate, boxing lingual to the tips of the incisors, and the occlusal surfaces of the cheek teeth, and in the lower the tips of the incisal half of the lingual surface, and the boxing lingual to the lower incisor teeth, and the boxing over the occlusal surface of the cheek teeth, with accommodation in the upper and lower models for improvement of the close bite, if present. It will be noted that no widening of the lower is provided for, and if this is required the plate should extend to the lingual surface of the lower cheek teeth. With sufficient wax added to give the form of the "Monoblock" the upper and lower are sealed together and the waxing up and the processing carried out on the upper model. The acrylic resins make a very satisfactory and attractive plate. The screw is turned  $\frac{1}{8}$  circle three times each week.

Cases of Angle's Class II, div. 11 are also providing an interesting experiment, with plates with the same accommodation for forward bite, and widening of the upper arch with lingual springs to move the upper, and lower (if necessary), labially. McKeag's coil and arm spring for moving upper canines lingually and distally has proved successful in several cases. The "Monoblock" has proved very satisfactory as a retainer in cases treated by fixed appliances and inter-maxillary traction, with the appliance removed very early. The great majority wear the plates, however bulky, with no apparent inconvenience after the first night or two.

An oral screen of celluloid was shown with a spring of 0.3mm. wire tied in to move the upper incisors lingually. In two cases of Angle's Class II, div. 1 under treatment by intermaxillary traction, the lower lip rests lingually to the tips of the upper incisors. Slow progress was thought to be due to this faulty lip action. The labial arch was made loose enough to be removed at night, and the oral screen worn. Both cases were away at school and managed the changes very well, and then made very good progress. The writer finds from recent experiments that a clear acrylic resin with the springs processed in it, is easier to make, and may supersede celluloid for oral screens.

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## Beveridge—and the Future of Orthodontics

By ROBERT CUTLER, L.R.C.P.Lond., M.R.C.S., L.D.S.Eng.

In the course of many years' faithful, if quite uninspired, service as Secretary of your Society, there have been many occasions on which I have been in violent conflict with my fellow members and office bearers, and at one time I must admit that I looked forward to the occasion when, purely as a result of an over-ripe seniority and lack of other suitable candidates I might be elected President. As you know, the President's inaugural address is unique in the sense that no discussion is customary, and my mind dwelt on the diverting opportunity given by such an address, when the most extravagant personal views could be ventilated without fear of subsequent contradiction ! I do realise however, that as there are many very desirable Presidents to-be still in our midst, such a chance is likely to be denied me, so I must perforce enter the arena of free discussion now by considering a subject of the utmost importance and topicality, and upon which it is imperative that there should be a clarification of our ideas. In this connection you are doubtless aware of the activities of our Special Committee, formed in the latter part of 1942 at the suggestion of a member of Council, and comprising those members of the Society who can be taken as representative of every aspect of orthodontic research, teaching, and treatment. This committee has met many times and as a result of its deliberations, has prepared memoranda on education, post-graduate teaching, and treatment of the elementary school child. These will prove valuable in themselves, in so far as they may aid the clarification of ideas to which I have referred, but they have also been useful in forming the substance of a report we have been able to present to the Interdepartmental Committee on Dentistry, in response to an invitation conveyed to us not long ago. But for the existence of this Special Committee as a functioning unit I doubt whether it would have been possible for our Society to have responded to this invitation within the time specified, and I am sure you are appreciative of the work they have done on our behalf. My contribution to-day is a purely independent one and may be interesting, as since the war, with the absence of my two colleagues on service, I have had to withdraw from the practice of purely specialised orthodontics, and from the hurly burly of my present professional life can view the problems from the standpoint of a general practitioner, though naturally my viewpoint is in a measure tempered by my past teaching experience, and by experience of specialist practice before the war.

Of course, if we look back, we realise that even before the war, there were stirrings in the national conscience as to the need for availability of every form of medical and allied treatment to every section of the community, and now the swelling tide of our affairs has sharpened this feeling, which has been crystallised for us by Sir William Beveridge whose "plan" amongst other things, visualises a comprehensive medical and dental service for the Nation. As such our medical colleagues and ourselves are vitally concerned, and as the first tangible impact of this new concept has fallen upon the doctors we might do well to study the reaction it has inspired in their midst. It would at once appear to the friendly—if cynical—observer that our medical colleagues have retired to the inner keep of their fortress—it would be quite unkind to call it a "Citadel,"—and for their ammunition, which they are using with uncommonly good effect, they are relying on such motifs as the "ideal doctor patient relationship," "free choice of doctor" and so on, and quite clearly the Minister of Health has so far found no counter tune for the ministerial ramshorn, whereby the walls of the medical Jericho would fall down, and the occupants be



delivered into his hands. So far, so good, and yet I feel the position of the general medical practitioner is less strong than it was three or four decades ago, in view of the growth of specialism for the efficient treatment of any other than the more trivial complaints, whereby the power and prestige of the general practitioner, *as a personal healer*, is inevitably diminished. Now quite apart from many other important considerations I feel that we as a specialist fraternity, are in a much stronger position, if only in so far as benefit can accrue to the populace from the labours of our hands, *and ours only*, so that we should have no difficulty whatsoever in creating conditions of service entirely satisfactory to ourselves. I therefore deprecate panic measures and emergency legislation within our own ranks, but beyond this it is not proper or seemly for us as a purely scientific Society, to venture to-day. Whether or not it is agreed that our position is intrinsically strong, we should by no means blind ourselves to the very real shortcomings of our pre-war activities in the speciality of orthodontics, which will have to take its place in the general framework of post-war dental service, and it is my intention to consider these shortcomings in detail, particularly as they may be aggravated by the conditions of the post-war world. Indeed we must face these shortcomings frankly and show how within our own autonomy we can overcome them if our case against enforced reorganisation from without is to be complete. To be logical, therefore, we should start our review by considering what importance, if any, attaches to the value of orthodontic treatment in the minds of the dentist, parent, and public bodies, dealing with health care. The *degree* of importance would seem to depend upon a recognition of the *extent* to which the growth of dental abnormality and lack of remedial treatment interfere with accepted standards of health, happiness and biting efficiency of persons in general, and to some degree the three groups I have mentioned are all concerned. The dentist, of course, because he is charged with the technical handling of treatment when his help is requested; the parents, because they are personally concerned with the well-being of their child; and public health bodies because they are appointed by, and responsible to, the Nation for the general care of a large—and in future possibly much larger—section of the whole community. If then we ask ourselves how orthodontic troubles can affect the happiness, health and efficiency of those afflicted with them it would surely be simplest to postulate how such conditions can militate against A—appearance, B—biting efficiency, and C—mouth health with all its general implications. As regards appearance, both parent and dentist are usually in agreement, for both parties will have approximately the same standard of what constitutes a normal face, and both have a deep seated—if unconscious—realisation that normality has a direct bearing on happiness for the average man, though you must not ask me to pursue this tempting rain of philosophical thought to-day. As regards biting efficiency however, the parent, and sometimes the dentist, may be less observant though sometimes we may find an intelligent and watchful parent commenting on how her child is always last at the meal table. In connection with mouth health the intractably inflamed gingival condition of a Class II mouth breather is a typical example of the malign influence of jaw abnormality, but the dangers of gingival pocketing and early loss of teeth due to gingival complications of “close bite” and so on, are less frequently, if ever, apparent to the parents. In private practice, of course, cases fall into two main groups, those brought for obvious symptoms by the parents, and those detected, often at a quite early stage, by the dentist himself, treatment being undertaken by the force of the dentist’s authority and by the parents’ trust in his integrity and good judgment. Paradoxically, it is this second group that is the really more important and the one likely to receive the greater benefit from proper treatment, but because obvious symptoms of the condition may not be marked at this early stage, the



dentist may receive less acclamation for his successful treatment, than in those cases in which he snatches a sensational, but often Pyrrhic victory by cure or palliation of a desperate abnormality. It is not unnatural, therefore, to assume that any controlling or would-be controlling authority, however conscious of the harmful effects of mouth abnormality in principle, might tend to react like the average parent and thus be inclined to give priority of whatever attention was made available to the treatment of late, or well established cases, the results of handling which are often of less intrinsic worth than of those cases in which intervention was earlier. It is true that this danger would be minimised if the controlling body were furnished with authoritative and powerful dental advisers, but it is clear that any independent help or guidance that could be given to such lay, or semi-lay, bodies might prove of the utmost utility, and might materially assist the official dental advisers whose task is to advise, and not educate, the bodies to which they are attached. Here at once, therefore, is a matter well within the province of our Society whose co-ordinated effort might well be productive of a report or booklet which, by covering both the popular and technical implications of orthodontics, might help both laymen and dentist alike. It seems to me that if it is not beyond the power of, say, the Ministry of Information to sponsor booklets like " Bomber Command " which contains much interesting and accurate information prepared in such a form as to be attractive to all classes of the community, it should not be beyond our compass, retaining within our membership some of the keenest brains in the profession to-day, to compile a similar record of information and service, though I grant you that the destructive arts of war, particularly those arms which can, and are being, used on the enemy with greater effect than they can at present be used against ourselves, have an immeasurably greater glamour at the present time than those connected with the ways of peace. Such a report or booklet should hammer home the significance of tooth and jaw abnormalities, it should stress the intrinsic importance of their early detection, and it should outline the general principles of treatment whereby the maximum benefit can be secured with the utmost economy of skill and effort. Such a report could well be compiled in two parts, the first covering the field in general, and couched in lay terms, well illustrated with photographs and diagrams, and as such entirely suitable for lay health bodies interested in child welfare, and for all appropriate committees of local authorities. The second section, or if you wish a companion booklet, should be more technical and could be usefully read by dentists in general, particularly those employed in, or entering, the National Health service in which orthodontic treatment must form a part. I would emphasise that this section of the report should be largely concerned with *guiding principles of treatment* which even now are by no means universally appreciated, and should formulate the conditions both general and local under which treatment is likely to be of permanent benefit to the patient. The first section of the booklet should present no real difficulty in its preparation as, once the appropriate material is collected, its presentation could be entrusted to any dental surgeon accustomed to public relations work, particularly if his journalistic style had that happy blend of authority and informality characteristic of the literary efforts of Samson, Rowlett and others whose names come easily to mind. The second section would admittedly be more difficult as no two experts are agreed except on basic principles, but it is a formulation of these which is *exactly* what is required. The preparation of such a report might seem to you to be entirely redundant, but that is because you are experienced orthodontists and have come to know by intuition what the significance of any jaw or tooth abnormality implies, and what measure of success is likely to accrue from the appropriate treatment. We must remember, however, that unless we have had quite considerable teaching experience we might be hard put to it to explain



to a less experienced colleague, and infinitely more so to a layman, which factors *did* influence us in our decision, and the circumstances which influenced our evaluation of each factor we had noted before coming to that decision. We must keep firmly in our minds that there may be many dentists who have not the same orthodontic experience as ourselves and that parents, although vitally concerned, can help us but little in our consultations, and that beyond all peradventure any statutory non-dental body can only be worse off in this respect than either of the other two parties concerned. Any move, therefore, that provides some common ground on which all can meet with a modicum of intelligent comprehension of the problems concerned should be all to the good. It is abundantly clear that in course of time these official bodies will wish to explore our special field, and whilst it may not lie in our power to provide a signpost, actually perambulating down the road in which it is pointing, it certainly seems reasonable for us to provide some rough indication as to where their travel will lead them! If therefore by some such methods as these we make progress in acquainting non-dental bodies with these facts and so prepare the ground for orthodontic treatment on a large scale *under reasonable conditions of success*, our next problem is to decide whether our profession is technically equipped to give the necessary service, and more important, whether such service can be said to have been given in the past *to a sufficiently large enough number of persons to give reasonable hope* that a simple extension, rather than a total reorganisation, of our pre-war system would meet the new situation, the outlines of which are already materialising. My answer to those questions is in each case—No; I do not, for reasons to be examined in detail, consider that our profession is well equipped for the giving of efficient orthodontic treatment, and I contend that such treatment as has been available up to now has been concentrated on all too small sections of the whole community. Accordingly, our first examination should be whether present methods of orthodontic training are likely to provide a plentiful supply of men, whether specialist or otherwise, who are technically qualified to deal with the work in hand, and we are then at once in difficulties over *A* what shall be taught; *B* who shall teach it; and *C* whether, when *A* and *B* have been settled, the combination of the two mentioned, are *by themselves* sufficient to produce an adequate supply of no less adequately trained men. As regards what shall be taught to students I propose to consider this later, in principle only and not in detail, as our Special Committee has already covered the ground and has prepared a report which is available for you to read. As to who shall teach it is less easy to answer, the whole question being bound up with the chronic dearth of whole time teachers and specialists, both young and old. That whole-time specialists are essential should be self evident because if two men, *A* and *B*, are taken, both of equal native skill and intelligence it is clear that experience based on the number of successful and unsuccessful cases treated is bound to be wider in the case of the man who does nothing else, than in his equally skilful colleague who only gives half his professional time to orthodontics. This is not to disparage the latter group, who represent an intensely valuable section of our present strength, but only to emphasise that, other things being equal, the fund of experience and specialised technical skill of the wholetime practitioner will as a rule be greater. This admitted scarcity of whole-time specialists has many causes, but one, I am certain, is the lack of support and encouragement given to the younger would-be specialist, not only, or largely, by his colleagues, but rather by his academic body who may be employing him in a teaching or supervisory capacity. Most dental schools in this country have orthodontic departments, and we can assume that under the Director, who quite often has other administrative duties quite unconnected with orthodontics, there will be chosen a reasonably capable—if not brilliant—young registrar, demonstrator, or call him what



you will, and upon him much of the burden of technical administration and general chair side orthodontic teaching will devolve. Now if this official is given no real incentive to specialism, what usually happens is that he combines his orthodontic departmental work with private general practice, and since by hypothesis he is probably above the average in general skill and intelligence—otherwise he would not have been chosen in the first place—it is a fair inference that his above-average abilities soon find recognition in private practice. After a few years, therefore, his private general practice may have prospered sufficiently to be supplying him with the major part of his total income and from thenceforth, if he continues his departmental work, he will be serving two masters. By this time, too, it should be remembered that his orthodontic experience will have become not inconsiderable, his powers as a teacher increasing proportionately, but unless he has constant encouragement from his academic body one of two things happens, either he continues to work in the department with much of his main interest directed to the very tangible rewards of private general practice, or he abandons his teaching work altogether in favour of the latter ; should he do this, the whole of the orthodontic knowledge garnered in the departmental field, is locked up in his own head and utilised by him, in his own narrow sphere, for his own private profit, whilst his tenure of office represents a dead loss to the academic body, and means that there will follow a period of relatively inefficient teaching until his successor has been long enough in office to gain a similar degree of experience. If this conclusion is questioned, I challenge any one here to quote the names of more than a handful of men who are whole-time specialists and who do no other non-orthodontic administrative work in their own hospital. It seems abundantly clear to me therefore that the younger teachers and departmental office holders *must* be given sufficient encouragement by their academic bodies to render them immune to the undoubted attractions, I might almost say glamour, of successful private practice, though by this I am referring to the conditions of peace-time private practice, and not to the purgatory of civilian dental “ Stakhanovism ” we are conducting at present. (You will remember that Stakhanov was a Russian factory worker whose output was consistently so high that he was given the decoration of “ Hero of the Soviet Union ” ; most civilian dentists are unquestionably “ Stakhanovites ” willy-nilly for the duration, and though both medals and glamour are absent at the present time, we have no reason to doubt that the recognition of personal success will again be a feature of the post war world.) Not only so, but the profession at large, if it is to expect the recruitment of a body of whole-time specialists on whose skill they can rely, must also play its part and be ready to give the utmost support to those ready to undertake bona fide specialism, whose ultimate flowering, can only bring credit on the profession as a whole. We cannot, however, hold private practitioners very much to blame in this matter as the number of bona fide specialists to whom they might refer patients has at all material times been far too few for this to have become a regular practice and the reluctance of a practitioner to refer an orthodontic case to a colleague who also practices general dentistry is understandable, however expert the latter might be in the orthodontic field. Here again we have another unfortunate repercussion of the failure in dissemination of orthodontic knowledge generally, as the practitioner well grounded in theory, and practiced by observation in this speciality, not only soon comes to know the types of case he can treat himself with ease and safety and great satisfaction to all concerned, but is also able to recognise the more obstinate type of case in which a mature judgment and really expert mechanical control is absolutely essential if any good whatsoever is to accrue. Our peculiar scholastic system is also concerned in this matter, as for some reason, certainly not fully clear to me, it seems to be the rule that the more well-to-do the parent, the farther away is the



child sent to school, and unless the dentist is able to exercise really firm discipline, the patient is denied regular supervision either from the dentist himself or from any specialist to whom it might have been possible to refer the case. This point will remain a material one, if our present private, as distinct from State School, system is to continue and lends added force to the virtue of the group specialist system to which I shall later refer. All this is in a measure bound up with the economic standards of specialism which I shall consider now. In times gone by, and certainly within my professional recollection, there has been a tradition that prominent and successful members of the healing profession should give their services free to hospitals, and indeed the voluntary teaching hospitals have never lacked the services of very good men; so that in theory at least, the under-privileged classes attending such institutions have had at their disposal the best in the land, and in fact this system did not work too badly when there was a powerful upper, or privileged, class whose patronage gave sufficient monetary return to their medical and dental attendants to allow them to be, in the main, free of financial anxiety. Indeed I can well recall more than one instance of rather romantic medical Robin Hoodism in which practitioners gave their services to the poor quite unstintingly through the medium of the voluntary hospitals, but had no scruples in charging the more foolish of their rich patients the most astronomical fees! That colourful state of affairs has, however, or is passing, and instead of an under-privileged class, we have a large and growing semi-privileged working class, conscious of its power, and perhaps rightly, not prepared to be content with anything less than the best possible in medical and allied treatments; coexistent with this we have a grossly over-taxed, over-burdened and discouraged middle class, and a sorely diminished "upper" or leisured class. All of these are very potent factors when the availability of specialised service is in question, and we can particularise by considering what must needs happen to a case requiring orthodontic treatment beyond the range of the general practitioner. At present the only really practical alternatives are the orthodontic departments of teaching schools or the services of a specialist, the latter in any case being far too few in numbers, whose fees for a two year treatment will certainly be not less than one hundred guineas and may easily, and quite justifiably, be considerably greater. That this is an unsatisfactory state of affairs will at once be apparent, if we remember that in a total population of approximately forty-four million, the number of persons having a taxable income of between one and two thousand pounds per year is 286,000, and if you remember that the net tax-free income from earnings of a £1,000 is about £770 you can appreciate to what a restricted section of the whole community private specialist services of the best type are available. Treatment in orthodontic departments of teaching hospitals may be reasonably efficient, but in the nature of things is usually slow, and almost invariably grossly wasteful of time to parent and patient. As a model scheme this represents a state of affairs not likely to appeal to a would-be controlling authority, particularly if the latter is being jerked into action by a mass of the population, incited by the trumpetings of the popular press, whose headlines on quite ordinary affairs are sensational to the point of unintelligibility, though doubtless understood as a result of long practice on the part of those who read them. Now in the field of medicine, if we take the specialised treatment of chronic rheumatic complaints as an example, our medical colleagues might point to the Red Cross rheumatism clinic as a model of specialised treatment at moderate fees, and in consequence I have no doubt that in any plan of comprehensive medical treatment such an organisation might well be taken as a pattern, and simply expanded to cover the wider field created; but in our own ranks, it would be impossible for us to point to any similar organisation concerned with orthodontic treatment. A plan clearly helpful from the private



treatment point of view would be group specialist practice on an orthodox partnership basis in which part-time attendance by one or more of the partners at a subsidiary centre or centres would widen the scope of operations considerably. Such a scheme has obvious advantages in lowering the cost of treatment without sacrifice to those giving it, first on account of the obvious saving in operating costs, and secondly because each partner's capital share has a definite value on retirement, as distinct from the position of a specialist practising on his own, whose retiring goodwill is valueless. Further the formation of such units or groups would give opportunities for inclusion of younger men anxious to specialise, particularly if at the same time they were holding part-time appointments in the orthodontic departments of teaching schools. A further suggestion is the formation of private paying orthodontic clinics organised as self supporting units by the dental hospitals, which in addition to dispensing efficient treatment, could form centres of post-graduate instruction, the fees paid for which would aid the financial self-sufficiency of such organisations. The bulk of general practitioners would certainly encourage, and not oppose such a scheme, as it would in no way endanger their livelihood, whilst it would give tremendous incentive to junior men attached to the parent hospital who, naturally, after a period of time, would be qualified by experience to work in it. The livelihood of existing specialists would also not be endangered by such an arrangement. Indeed they could and often would, participate, if they so desired, as the institution would tap an entirely new field of patients who otherwise would not be able to afford the established specialists' fees. These suggestions are offered on the supposition that by such means both the availability of treatment and the supply of specialist workers and teachers could be materially augmented without unduly radical departures from existing practice, and could be independent of any schemes designed to further the orthodontic welfare of the elementary school child. Another approach to this subject has been made by our Special Committee whose second report visualises the formation of an independent post-graduate school for the training of specialist orthodontists, who would then be available for teaching and specialist practice in private and state-directed spheres; indeed it might be arranged that the State Service would select certain men, already in its employ, for such specialist instruction, making the necessary grant to the institution for such training, which by inference would be particularly valuable, as the trainee would already be familiar with the spirit and general functioning of the State System in which his service had met with approval. This report should by no means escape your attention now that it is available, as it is practical and comprehensive; it deals with all kinds of detail regarding the staffing and running of such an institution and will form a valuable record on a subject on which information will sooner or later most certainly be required. I do not, however, believe that the suggestions outlined in the report in any way invalidate my own proposals which in essence constitute not so much a new departure, but rather a much needed enlargement of our, at present, quite inadequate system. As regards treatment of the elementary school child I speak with no authority or experience, and indeed I do realise that until routine rehabilitation service is fully available for every child, specialist services of this type must remain in abeyance. It is clear, however, that the appointment of whole or part time specialists is in every way to be desired, as not only would much needed encouragement be given to younger men, but also it would mean that any orthodontic treatment that could be made available would be dispensed with the utmost economy of time and effort. I have purposely omitted any detailed consideration of the question of what should be taught, for certain very good reasons, first because this does not concern, or secure the interest of, non-dental bodies, who might in principle be sympathetic to the furtherance of orthodontic schemes, and secondly because the



subject lies so largely within the province of the teaching bodies themselves ; further I am sure that these latter bodies know, as well as you or I do, that a set syllabus of instruction has only a limited value, designed largely to keep the august—but often fretful—examiners within reasonable bounds, and occasionally helpful to those burdened with the thankless task of writing the students' text books. It is a fact that teachers are born not made, and it is my experience that the born teacher in love with his subject is always entirely clear in his own mind as to what should be taught, and by the driving force of his own personality usually succeeds in imparting his knowledge to all but the cretinous and wilfully lazy. Such a man has little regard for a syllabus of instruction which is for him only a skeleton to clothe with flesh and animate with the vital spark of life. We should, of course, press for the allocation of the maximum number of student hours to the study of our subject, and provide a framework of study to indicate the limits within which knowledge is required, but beyond that there are good reasons for allowing teachers and centres of orthodontic teaching the utmost liberty, until our other more pressing problems and difficulties are at least stabilised. In connection with the subject of teaching generally, the point may be put to me that post-graduate courses that have been made available from time to time meet some of my criticisms regarding higher orthodontic education, and although I am quite prepared to believe that such courses have been entirely successful, I am by no means ready to admit they are of any practical help in providing specialist instruction ; the Special Committee in their report have suggested a one year course in specialist instruction, and I for my part am convinced that some such period of eating and drinking, waking and sleeping, in a purely orthodontic atmosphere is essential to provide the background against which later technical experience can be shown to advantage. The only matter now left to us, as we consider the availability of good orthodontic services, is the position of those men who although established in successful general practice and often unattached to a hospital in an orthodontic capacity, have none the less by their own interest, skill, and effort, developed a considerable degree of orthodontic experience. These men are not specialists or even quasi-specialists, and the call on their general professional time often makes them disinclined to undertake another man's work, and even when they are ready so to do their services may only be known to a select few of their personal friends. We understand and take for granted that membership of the B.S.S.O. does not necessarily imply any particular measure of skill but is essentially an indication of interest in the speciality, and it seems to me that the Society might grant special recognition (not in any sense by a degree or diploma, which could only be granted by a statutory body), to such of its members or to other members of the profession of outstanding merit. Conditions for such recognition should stipulate establishment in private practice for not less than five or seven years at least, the preparation of a thesis or provision of evidence of having given, or published, a paper of sufficient merit on orthodontic matters, and submission of at least five complete case histories as examples of treatment by themselves in their own practices. The men of whom I am thinking could satisfy these requirements automatically, and if their names were then suitably "starred" in our members list, it would prove of inestimable value to a user who might well be unacquainted personally with the names therein. The men of whom I am thinking are not anxious for more work, of that I am certain, but such a plan would at least be a mobilisation of authority and experience and would form focus points all over the country as a basis for friendly but expert co-operation over cases, with results that could only be good for all concerned.

Ladies and Gentlemen, these conclude my observations to-day. They are in a manner inspired by my belief that private practice in every dental sphere will continue unabated in the future, though we realise that comprehensive national schemes will play a larger part than ever before. If such a partnership for the national welfare is to



be successful it is our obvious task to attend to the shortcomings in our existing service, and also to give all possible help and advice to those sponsoring national schemes to further better orthodontic treatment. Success in the former will be our surest safeguard for future survival in our present private capacities, success in the latter is essential for the credit of our profession as a whole. There are larger issues too, for I presume we plan in firm expectation of total victory by the United Nations at no too distant date, and because we have the tragic prescience that before the struggle is over, a million graves or more will mark where courage lies, we are determined that the fruits of victory will not be needlessly dissipated as was the case before. An immediate result of that victory will be the crystallization of a new social order in which dentistry and its specialities must play their proper part, and it would seem incumbent upon each one of us, honestly conscious of the importance of the study and practice of orthodontics, to see that it takes its proper place in the general dental sphere.

The future, by the merciful dispensation of Providence is hidden from us, but in this narrow sphere at least, the moulding of it is in our hands alone.

## DISCUSSION

A general discussion then took place on Mr. Cutler's paper. Owing to the importance of Mr. Cutler's remarks, it was decided to continue the discussion at the next meeting and to include in the adjourned discussion comments on the Reports of the Special Committee which considered the teaching of orthodontics to undergraduates, the orthodontic treatment of elementary school children and post-graduate orthodontic teaching. It was agreed that copies of the Reports should be sent to all members before the next meeting in order that everyone should have an opportunity to become conversant with details of these Reports. It was further agreed that Professor Friel should open the adjourned discussion.

**Dr. S. Friel**, in opening the resumed discussion, said that during the last two years a number of Committees had been appointed to consider post-war reform of medical and dental education, and the Council of the Society had formed a Committee to report on the teaching of orthodontics in dental schools, post-graduate teaching and the orthodontic treatment of elementary school children. The members of the Committee agreed on the need for reform in those subjects, but he was sorry to say that they were divided on almost every fundamental point as to how the reform should be carried out, and consequently there were two Reports, a Majority Report and a Minority Report.

What was wrong with orthodontic teaching? He thought it was not realised that the subject was far too big to be taught completely in the dental curriculum. Similar conditions had arisen in medicine. The medical educational authorities were fully aware that it was not possible to train students to be competent to treat diseases of the eye, ear, nose and throat and other specialities, and consequently they had endeavoured to teach the theory, so that the student, and later the general practitioner, could diagnose, if only partly, that there was trouble in those parts and would realise that they should refer the patients to specialists. He had asked a Dublin ear, nose and throat surgeon how much the students actually did in treatment of patients, and he had replied: "Nothing at all, except examining and seeing the surgeon carrying out the work." On Saturday last he had asked his nephew, who qualified at Oxford about four months ago, how much he had done, and he had replied that, so far as treatment was concerned, he had done nothing at all, except putting drops in patients' eyes. He did say that the students received a very sound training in the principles of their branch, so that they could diagnose a condition.

The teaching of orthodontics for the last thirty-six years or longer had been mainly devoted to treatment and the technique of appliances. Even when he was a student, which was thirty-six years ago, he had had to complete two orthodontic cases, and that procedure had con-

tinued up to the present time, but there had been a very small amount of the theory or the principles of orthodontics taught, and it was only in the latest orthodontic books, such as Salzmann's *Principles of Orthodontics* and the last edition of Dewey's *Practical Orthodontics* that the principles of orthodontics were given in any detail.

What had been the result of the teaching up to the present? A student qualified and put up his plate and tried to collect a practice together. How many orthodontic cases did he treat in the first five years? He would be fortunate if he treated six cases. At the end of the five years how much of the technique that he had learned at the dental school did he remember? If, however, he had been taught in detail, both in lectures and clinically, the development of the dentition, both normal and abnormal, and the ætiology of malformations, every child he saw would be a matter of interest to him and he would be in a position to diagnose maldevelopment and point it out to the parents before it had become a glaring deformity.

On that account the Committee in its Report laid great stress on the teaching of the principles of orthodontics, and except for the simplest form of treatment, relegated treatment to a voluntary undergraduate course or to a post-graduate course.

The Report on the teaching of orthodontics to undergraduates which had been circulated to the members was only an interim Report, which had been sent to the teaching bodies with a request for their comments, and the final Report had been adopted only on Saturday last. The interim Report had been somewhat altered, partly as a result of the comments received from the schools and partly as a result of the Committee thinking over the matter themselves, and he would like to point out the differences between the interim Report and the final Report.

A number of the dental schools stated in their comments that the normal development of the dentition was taught in dental anatomy and should not be taught by the orthodontist, so after the paragraph headed "Normal Development of the Dentition," on page 4 of the interim Report, the Committee had inserted the following paragraph: "The student has already studied Anatomy, Physiology and Dental Anatomy. Orthodontics, however, requires more detailed treatment of some parts of these subjects. It is concerned with the developing child and requires additional knowledge of the changes in bone and muscle growth and the positions and relations of the teeth and jaws to that commonly taught by the anatomist. The application of these subjects to the developing child is part of the basis of orthodontics and this application can only be taught by an orthodontist." The anatomist was really dealing with a dead subject, whereas the orthodontist was treating a living and developing subject.

The next important alteration was on page 6 of the interim Report, where the three paragraphs under the heading "C. Classification. Bennett" had been deleted and the following paragraph substituted: "C. Classifications. There are various classifications but none is adequate. Students should use the correct nomenclature to describe malocclusion."

The last major alteration was at the end of page 7, where the following new section had been inserted:—

#### "VIII. REMEDIAL TREATMENT.

- (1) Extraction of teeth.
- (2) Mechanical (or a combination of surgical and mechanical).
  - A. Appliances and exercises to assist the development of function, e.g., lip, tongue and jaw exercises.
  - B. Physiology of tooth movement. Effects on bone and teeth of:—
    - I. Various degrees of pressure and tension.
    - II. Periodicity of pressure and tension."



It would be noticed that on page 2 of the interim Report the course was divided into two parts, a compulsory part (Part I) and a voluntary part (Part II). Part I had now been divided into (a) and (b), (a) being the lectures and (b) the clinical teaching and technique. Under the heading "Part I (b). Clinical Teaching and Technique" the following had been inserted :—

- " I. Clinical teaching of diagnosis, including serial examination of unselected children and models from two years of age.
- II. Clinical teaching of preventive treatment.
- III. Clinical teaching of remedial treatment, including treatment by extraction only and including the design, construction and insertion of appliances for the movement of a lingually placed upper incisor or incisors over the bite.
- IV. Technical instruction in the making of such appliances.

*Note.*—It is recommended that wire bending, spot welding and free hand soldering be taught during the prosthetic course."

There were some small alterations, mainly verbal, in Part II, but he would not go into those.

At the bottom of page 1 of the interim Report the Committee made two recommendations, the second being : " There should be a special examination in Orthodontics, and the examiners should be specialists or have a special knowledge of Orthodontics." In the comments which the Committee had received only one teaching body objected to that, and, as far as he knew, all the universities had special examiners ; it was only in the Colleges of Surgeons of England, Scotland and Ireland that the examiners in orthodontics were also the examiners in dental surgery. It was very difficult to see how an examiner in dental surgery could have the knowledge of orthodontics or keep up with the literature of orthodontics so that he could examine in Part I of the syllabus, and he hoped that any member who had influence with the powers that be would use that influence to get this system altered.

With regard to post-graduate teaching and the treatment of elementary school children, he did not think anyone would say that reform was not necessary. There was no British post-graduate school for the training of specialists, and anyone who wished to become a specialist (by a " specialist " he meant a person who practised orthodontics exclusively) either had to go abroad, usually to America, and spend a year at one of the post-graduate schools there, or had to go to an orthodontist already in practice and work with him and in the school to which he was attached. Both those methods greatly reduced the number of orthodontists ; the first because of the expense involved and the second because an orthodontist could take only one pupil at a time.

The Report on post-graduate teaching set out in detail how a British post-graduate school could be founded to produce specialists. The Committee recommended that the teachers should be full time, because it felt that, as Mr. Cutler had aptly put it in his paper, they could not serve two masters—both very exacting masters. If the teachers were not full time, they would either give their all to teaching and research and neglect their practice or do the reverse. The Committee also recommended that a research department should be part of the school, and personally he thought that was very important. Not only should the staff carry out research but every student should be taught the methods of research. Each student should undertake the solution of a problem, and in order to do that he would have to read not only all the literature on the problem but also a great deal of collateral literature. He could think of nothing that would broaden the student's outlook more than that training in observing and reading.

The Committee recommended a course of one year, as it felt that the theoretical part of the subject could not be taught in a shorter

time than that and a year would give sufficient time for the student to see some of the results of his cases.

In the Minority Report two types of course were suggested, one of six months for specialists and one of three months for half-specialists. The latter were to have training only in treatment by removable appliances. The Minority Report said: "We visualise courses of instruction in which the teaching is based on practice and in which theory, remote from practice, is not included." In that case, as far as he could see, the orthodontists would not be much better than technicians. In the Minority Report the claim—astonishing to him—was made that 75 per cent of cases could be treated by removable appliances, and he presumed that meant with the best results possible. He did not think that 5 per cent of his own cases could be treated efficiently with removable appliances. He knew that about 90 per cent of cases required rotation of their upper molars, and he did not know how that could be done with a removable appliance. Could the semi-specialists have sufficient theoretical knowledge to diagnose the conditions that could be treated with removable appliances? Would it be economical to have a specialist and a half-specialist working in the same district? He did not think so. Lastly, would it be fair to the specialist that all the cases where a 100 per cent result was possible should go to one man and that all the cases where a 100 per cent result was problematical should go to the other man?

He would like to stress the fact that the Majority Reports on undergraduate teaching and post-graduate teaching were complementary to each other. If the nation was to have a comprehensive orthodontic service it would require 100 orthodontists. Provision had been made for that, so that it would be possible for dental surgeons to refer all cases to the orthodontist for treatment.

**Mr. Harold Chapman** said that before he realised that the meeting was going to discuss the Reports to which Dr. Friel had referred he had prepared some remarks on Mr. Cutler's paper, which he understood was to be discussed on the present occasion, but, owing to the shortness of time, he would reserve his remarks on Mr. Cutler's paper for another occasion and discuss the Reports now.

With regard to the Report on the teaching of orthodontics to undergraduates, Mr. Rix and he, who formed the minority in the case of both the Reports, differed from the Report circulated in two important respects. They said that the students should treat patients and that the treatment advocated in the Majority Report, namely, the moving of two incisors, was not sufficient. Moreover, it did not seem to him to be practical, because he did not see how it would be possible always to have patients who required that treatment at hand just when the students were there to give it. Mr. Rix and he said that the students should treat patients for a minimum of 100 hours and that the syllabus should be shortened. The replies from the schools were 3 to 1 in favour of students treating patients, so the following words had been added in the Majority Report, saying exactly what the students were to do: "Clinical teaching of remedial treatment . . . including the design, construction and insertion of appliances for the movement of a lingually placed upper incisor or incisors over the bite." The contention which Mr. Rix and he put forward was that such a provision would not satisfy those who said that students should be taught treatment. At the present time the students at Guy's Hospital did approximately 200 hours of treatment, so the recommendation made by Mr. Rix and himself was not an untried one. If the students treated only one type of case, the treatment of which was regarded as simple and the result not in doubt, would not they obtain a very warped idea of orthodontic treatment? One member of the Committee had expressed his willingness to have more treatment included but had not gone to the length of voting in



favour of that, and, if he had judged the signs correctly, another member of the Committee had been in favour of the inclusion of more treatment than was recommended in the Majority Report. In the schools and in the Committee itself there was actually a majority in favour of more treatment than was recommended in the Majority Report, so that that Report did not represent the true opinion either of the majority of the Committee or of the majority of the schools that had replied to the request for their opinion on the subject. One criticism that had been made of the views expressed by the schools was that they were not constructive, but the schools undoubtedly thought they were being constructive and, from their point of view, they were.

Another item in the teaching of undergraduates advocated in the Majority Report was the serial examination of unselected children, and again he did not think that was a practical proposition. How would it be possible for a student to see the same child over a period of time that was sufficiently long? He agreed that such teaching was very important and for many years he had himself given it by means of lantern slides. He thought that was a more practical method, although the other method was, of course, a better one. Teaching given by means of lantern slides could be supplemented by the models themselves.

With regard to the syllabus of lectures, Mr. Rix and he recommended that twelve lectures should be given and that the wording of the syllabus should be such as to leave no doubt in the reader's mind as to what was meant. The criticisms of the syllabus which had been received showed that there was some such doubt in regard to some of the sections, particularly Section II. They also recommended that there should be eliminated from the syllabus those subjects on which an orthodontist might not be expected to be the person best qualified to lecture, those subjects whose bearing on or knowledge of in relation to orthodontics was insufficient to justify their inclusion, and those subjects which had already been taught. The elimination of those subjects would enable more time to be given to clinical teaching. Among the subjects already taught, in accordance with the L.D.S. examination regulations, were biology, including the elements of genetics, physics, including mechanics, and anatomy, physiology and histology. If the teaching of those subjects did not include all that it was necessary for the student of orthodontics to know, surely it would be possible to have the teaching adjusted accordingly.

Mr. Rix and he considered that it was the function of the dental school to give training which embraced both the theory and the practice of orthodontics. In the Majority Report orthodontic practice was made optional for the student, and they did not agree with that, quite apart from the fact that it was not a practical suggestion. Moreover, it would tend to make orthodontic practice entirely specialist. The more that was known and taught of the practice of orthodontics the less likely was the practitioner to make mistakes.

If the Report which had been circulated was amended in the way that Mr. Rix and he recommended, a well-balanced orthodontic course, which included theory, practice, technique and clinical teaching, would result. Such a course was very largely in operation at Guy's Hospital, and if it was a practical proposition there it could be put into operation at other schools.

With regard to the subject of the orthodontic treatment of elementary school children and post-graduate orthodontic training, Mr. Rix and he considered that the scheme advocated in the Majority Report was too ambitious and did not present a satisfactory solution of the problem, which was to provide orthodontists and to provide orthodontic treatment for elementary school children. The British Society for the Study of Orthodontics was apt to lose sight of the fact that orthodontics was a branch of dentistry and received more attention than was justified because it had tended to become a specialised subject. The Society

had been established for about thirty-six years, but there were probably not more than five persons in Great Britain and Ireland whose practices were limited to orthodontics, so the members should not be under the impression that orthodontics, a part of dentistry, was more important than dentistry itself.

In the Majority Report the best possible case was made for providing orthodontic treatment for all children, to the point of overstressing the benefits that might follow, so that anyone without dental and orthodontic experience who read the Report would not see the problem in its correct perspective.

It was stated in the Majority Report that there must be a greater tendency to dental ill-health when the teeth were not in alignment. To his mind, that evaded the most important question, which was : Does orthodontic treatment reduce the incidence of caries and periodontal disease ? It was not known whether orthodontic treatment did reduce dental disease, but it might increase its incidence. The term "malformation" was used to describe all cases, but many of the members would agree that relatively few of the cases they saw deserved the description "malformation" though more of them might merit the description "malocclusion."

The demand for dentists in the school dental service was unsatisfied. It was recognised that school dental officers had not the time to give all the non-orthodontic treatment which was required. Where the number of patients per officer was reduced so that the best treatment could be given, there was an increased acceptance rate. There were therefore two factors which caused a demand for an increased number of dental surgeons, the increased number being required so that the number of patients per officer could be reduced and so that the increased acceptance rate could be dealt with.

The general treatment given by school dental officers was a definite health service, of positive benefit, required by 95 per cent of school children, and it was a preventive of malocclusion. Orthodontic treatment was required by only 5 to 10 per cent, and in many cases it took far more of the operator's time per individual than the other dental work. Accordingly, as a health service orthodontics was less important than the other treatment given by the school dental officers. He was, therefore, of the opinion that it was far more beneficial for the community that the demand for dentists for general work should be satisfied before dentists were diverted to orthodontic practice. The problem must be regarded from the point of view of the greatest good for the greatest number. The orthodontist required the mouth to be in good order throughout the treatment.

If, in spite of the considerations which he had put forward, an orthodontic service was to be developed, it should be on lines which would take into account the fact that at least one other branch of dentistry had very considerable demands to make on the personnel available.

The last paragraph of the Minority Report read as follows : " We are concerned to make the best use of the available dental personnel for the health of elementary school children. It is our opinion that these recommendations will accomplish this end."

The members had heard from Dr. Friel what was stated in the Minority Report, and that represented the views of Mr. Rix and himself on what should be done in the way of post-graduate orthodontic education and the orthodontic treatment of elementary school children, so he need not say any more on those subjects.

**Miss L. M. Clinch** said she would try to answer some of the points made by Mr. Chapman and to give the point of view of the majority of the Committee.

With regard to Mr. Chapman's statement that there were not sufficient cases of lingually placed upper incisors to enable each student to treat



one, her experience under the London County Council was that that type of deformity was by far the most common, and Dr. Friel had just told her that each time he went to hospital there were three new cases of it awaiting him.

With reference to the opinions received from the dental schools, the view of the majority of the members of the Committee was that they should produce a Report which would bring about an improvement in orthodontics and not leave things as they were; they felt there was great room for improvement and that some drastic steps would have to be taken. She felt strongly that if the Committee had received replies from the junior staffs of the teaching hospitals those replies would have been quite different from the ones actually received by the Committee, as she thought the junior teaching staffs were looking for more change than were the senior teaching staffs. The majority of the members of the Committee felt that the fact that the replies received from the schools indicated that they did not want the present state of affairs altered was no reason why the Committee should not produce what it considered to be a reasonable Report.

As to the serial examination of children by the students, it had been suggested during the discussions in the Committee that children in orphanages and other institutions could be sent regularly to the hospitals for inspection, and in that way the students could see both normal and abnormal mouths. It was very important that they should see children with normal mouths, because most of the children who came to hospital did so because there was something wrong with their mouths, and students were therefore apt to get a completely biased view of the average mouth and the amount of attention that the average child needed.

The minority of the Committee wished the number of lectures to be reduced to twelve, but the majority did not consider that the principles of orthodontics could be taught in twelve lectures. There was no suggestion by the majority that lectures should be given in such subjects as anatomy and genetics; their suggestion was simply that lectures should be given on the application of those subjects to orthodontics, and unless the lecturer was an orthodontist it would be difficult for him to do that.

As to optional courses, she thought it should be borne in mind that the whole undergraduate syllabus would probably be put in the melting pot, and it might be well to suggest that a certain number of months in the final years should be set aside for optional courses in orthodontics, pathology, surgery, prosthetics, and so forth, so that the student could choose which particular subject he would take.

She supposed that the fundamental difference between the majority and the minority was that the majority were in favour of specialists and the minority were not, although one of the minority was himself a specialist.

Mr. Chapman had said that the scheme put forward by the minority was in operation at Guy's Hospital. She had heard the opinion of two graduates of Guy's, both of whom were above the average, and neither of them was in favour of the present system of orthodontic teaching there nor was he satisfied with the results in his individual case.

One of the objections made to the post-graduate course advocated in the Majority Report was that it was too grandiose and would be too expensive. She thought that if an ideal scheme was not produced now the opportunity might never occur again, and £5,000 a year did not seem to her an excessive sum to pay for the provision of a first-class orthodontic service for the whole of the nation.

She believed that there were nine practitioners in England, Scotland and Ireland, whose practices were limited to orthodontics, and not five, as Mr. Chapman had said.

With regard to Mr. Chapman's statement that, if the scheme put forward in the Majority Report was put into effect, many people would

practise orthodontics who would be more usefully employed in practising dentistry, she doubted very much whether one hundred more dentists practising dentistry would be more useful than one hundred well-trained specialist orthodontists.

She did not agree that dentistry was a health service to a greater extent than was orthodontics. The psychology of the matter had to be taken into consideration. Her own experience was that in a great many cases children benefited not only physically but also mentally by having orthodontic treatment. Children had come to her by themselves, not being brought by their parents or sent by dental surgeons, to ask whether she could do something to straighten their teeth, because their lives were made a misery to them through other children laughing at them. She certainly regarded orthodontics as a health service, and she thought that was the view of the majority of the Committee.

**Mr. H. G. Watkin** agreed with Miss Clinch about the frequency of cases of lingually placed upper incisors. He saw two or three such cases every day, and sometimes more.

He thought that the psychological effect of treatment was very important indeed. For example, one of his patients, a girl of about 18, had been in the habit of putting her hand up to her face when she smiled, in order to hide her bad teeth, and her mother had told him the other day that after successful treatment she was now much happier and, in fact, quite a different person to live with.

**Mrs. L. Lindsay** said it seemed to her that Mr. Cutler in his paper had clarified a situation which was very much confused. During the last twenty-four or twenty-five years orthodontics had advanced so enormously and had discarded so much of the old teaching that the question of how to train orthodontic students was now a problem. A good deal of the discussion on the present occasion had shown that some orthodontists had forgotten that they were students once, and she thought it was very important to look at the subject from the point of view of the student. Mr. Cutler in his paper had pointed out the necessity for training dentists who would be able to undertake first-aid orthodontic treatment, if no more, and he had also recommended the education of specialists to whom cases could be referred for orthodontic treatment. The evacuation of children to all parts of the country on the outbreak of war had caused a great deal of inconvenience in the matter of fixed appliances. Children went away with fixed appliances, and when they needed repair or anything went wrong with them dentists in the various country districts did not know how to take them off or what to do about them. If the appliances had been removable ones the matter would not have been so complicated, and it was from the point of view of that complication that the education of the orthodontist specialist had to be considered. She thought that the practical training of the student was most important; unless students made appliances themselves they could not understand what the lecturer tried to convey to them.

**Mr. C. F. Ballard** thought that an attempt should be made to visualise how a school child was going to be treated. His own experience was that much of the haphazard orthodontics done at school clinics failed because a correct diagnosis had not been made in the first instance. He thought that showed that dentists who went into the school dental service must be given a basis of diagnosis of malocclusion, and before they could understand malocclusion, they had to be taught about normal development. There should be available for every child a specialist service to which the dental surgeon, having diagnosed malocclusion, should be able to send a child and from which he could obtain at least a suggestion of the line of treatment that should be followed. He did not think that a school dentist should attempt to carry out even simple orthodontic treatment without first getting a specialist opinion on the ætiology and diagnosis.



He did not agree with Mr. Chapman that it was necessary to plan in order to make the best use of the personnel available. He thought that plans should be made for the future so as to make the personnel available for the work. That meant, of course, that the dental schools must be enlarged and that plans must be made for obtaining more dentists.

With regard to the question of orthodontics being a part of the health service, at his hospital the parodontal department frequently said to the orthodontic department: "We cannot treat this parodontal condition satisfactorily unless you can correct the malocclusion." Orthodontics was needed not only from the æsthetic point of view; it was actually a health service from the point of view of the cure of parodontal disease and caries. He thought there was a tendency to overlook the association between orthodontics and the prevention of caries and parodontal disease.

**Mrs. Michaelis** thought that more stress than was necessary was laid upon active orthodontic treatment, i.e., remedial treatment, and that not nearly enough stress was laid on preventive treatment.

In her hospital orthodontic treatment was not given, because the dental surgeons there did not see children under 14 years of age, but they saw a very large number of mutilated mouths which had become orthodontic cases because school dental officers did not do preventive treatment, and presumably they could not give such treatment under their present conditions of working. She thought that, even amongst the 10 per cent of children who Mr. Chapman had said were in need of orthodontic treatment, the need for treatment would be removed to a great extent if school dental officers were trained and permitted to do preventive treatment in the way of holding a watching brief over spaces, preventing the early loss of deciduous teeth, and so forth.

With regard to the question of training, in 1924 and 1925 she had seen the two kinds of training given in the United States. She had there taken a three months' course in orthodontics under Mr. Martin Dewey, but she and many other students had found that that was not nearly sufficient to teach them what they wanted to know. It gave them technical ability but not clinical ability, so some of them went on to do ten or eleven months' training under Mr. Leroy Johnson, which taught them much more than they had been able to learn in the concentrated three months' course in orthodontics. She did not think it was possible for skilled orthodontists to be trained in three months; the training should extend over at least a year, and preferably eighteen months to two years. It was very obvious in the United States that the longer course produced not more skilled technicians but better orthodontists so far as diagnosis and knowing what the results of the treatment would be were concerned, because the students had an opportunity to follow their cases up for a much longer period.

**The President**, who had to leave the meeting at this stage, congratulated Mr. Cutler on his paper, which he thought, apart altogether from the scientific and technical matter in it, contained a very great deal of food for thought. He was quite sure that much good would eventually accrue to the dental profession and to orthodontists from Mr. Cutler's courageous efforts.

*(The Chair was taken by Mrs. Lindsay.)*

**Miss K. C. Smyth**, referring to the frequency of the occurrence of cases of lingually placed upper incisors, said she had recently written an article in which she had mentioned the very high incidence of those cases. Her cases under the Hertfordshire County Council orthodontic scheme were selected by the dental officers, and she did not know whether they exercised any preference in their selection of cases, but as a matter of fact she had had an enormous preponderance of cases

of lingually placed upper incisors sent to her. She had asked herself why those cases should be so numerous and had come to the conclusion that they might be due to the retention of deciduous teeth which were overdue for extraction. The children at the clinics were averse to having their teeth out at the age of 6 or 7 and their parents did not insist on it. She thought that might be the reason why in clinical and hospital work so many of the cases in question were found, whereas there were fewer in private practice, where the dental practitioner paid attention to the extraction of deciduous teeth if they did not fall out at the right time.

With regard to the need for orthodontic treatment being part of the health service throughout the country, she had not given that idea very much thought before the war, but the war had deprived her of her work in London and she had had to go into the country and had had various experiences there, including some years of general practice, after twelve years of specialisation, then eight months as a dental officer doing ordinary dental treatment under a provincial authority, and finally nine months spent in starting and running an orthodontic scheme under the Hertfordshire County Council. She had, therefore, had a variety of points of view presented to her, and she had been struck by the strength of the demand for orthodontic treatment in all the different spheres in which she had worked. That demand must be met if the population were to be satisfied. As Miss Clinch had said, the children themselves were beginning to feel the need of orthodontic treatment; they asked for it and co-operated in it, and they showed tremendous interest and even excitement when they saw the result of the treatment. She was quite sure that the treatment benefited them mentally as well as physically.

**Mr. K. E. Prince** said that Mr. Cutler in his paper had made the interesting suggestion that orthodontists should try to see whether they could agree on lines of treatment and had said that every specialist seemed to have different views on the basic fundamentals of the subject. It had occurred to him that orthodontists had shown that evening that there was another big difference of opinion among them; some thought of orthodontics with a capital "O" and others thought of it as a subject of less importance.

With regard to the teaching of orthodontics, he had now spent ten years in trying to teach orthodontics to students, including probationary classes which had a syllabus very similar to that suggested in the Report of the Committee, i.e., the construction of appliances only, and he had tried to combine that with teaching of an orthodontic character to show the students what it was all about, before they came into the children's department. He had sometimes asked them afterwards, when they came into that department, what they remembered, and they said they did not remember anything. It was not until the students did things with their hands as well as with their heads that they really learned anything about orthodontics.

As to Miss Clinch's remarks about the training at Guy's, he would not say that he was satisfied with that training but he thought that on the whole it turned out good all-round dentists, who were not absolutely defeated if they came across a case which needed simple orthodontic treatment. They were not all orthodontists, but there were facilities at the Hospital, in the way of assistant house appointments and house appointments, whereby a man could come to understand orthodontics better.

With regard to Mr. Cutler's plan on the question of clinics, he felt sure it would have worked well at one time but he was not sure that that time had not passed. He questioned whether it would work well now, when the whole country was in a turmoil with post-war planning, and so on, though one of the risks would be that it might work so well that the Government would take it over.



Mr. Cutler had referred to the training of younger men from the point of view of getting results and not from the point of view of some theoretical ideal. Some people had a theoretical ideal which he did not think could be achieved in many cases. He had not seen it achieved in other people's cases or in his own cases. Most cases that received orthodontic treatment were improved by it and very few were the worse for such treatment, but in hardly any cases was a really ideal result obtained. He thought that was a very important point.

**Captain Goldstein** said that he had taken his orthodontic training in 1938, and it was in 1936 that he had considered what branch of dentistry he wished to enter; he had then decided that he wished to go into orthodontics and had made his plans with that end in view.

He thought that the system of orthodontic training in the United States was not by any means perfect but it was on the right lines. With regard to undergraduate orthodontic training, in the first year in the dental college the student was given very little if any orthodontic training and in the second year he began to learn laboratory techniques, the taking of mouth impressions, and so on. Also in the second year the student was given a series of lectures appertaining to the theory of orthodontics, just to make him acquainted with the subject. Men were allowed to come in regularly to observe cases in orthodontics, and if they were particularly interested, they could, under the supervision of instructors, start a case and carry through the treatment to the end. A case of malocclusion at the age of 4 or 5 might not show any malocclusion at 10, 11 or 12, and, through models being taken of the same patient year after year by the students at the dental schools, at the end of eight or nine years a series of models had been built up which were studied by students in future years, who thus saw the type of case which, if it had been left alone, would never have needed any treatment at all, and also the type of case which needed early treatment. All that was part of the undergraduate training. When a student had finished his course at the dental college he was not considered to be qualified to practise orthodontics as a specialist. In his undergraduate training he learned about space retainers and other appliances, but it was considered that fully 25 to 30 per cent of orthodontics was preventive and that preventive treatment was an important part of the orthodontic programme. With regard to post-graduate training, he himself had taken a year of such training, but even after that he had felt that he knew very little about orthodontics, so he had taken a further course of post-graduate training. He felt quite sure that a course of training lasting about three months was not enough to make a man an orthodontist or even to start him on the road to being an orthodontist.

He thought that a programme for the education of parents could be a great help in solving the problem of orthodontic training and treatment, and a pamphlet on such education had recently been prepared for the American Dental Association, giving a series of lectures addressed directly to parents, so that the public could know the importance of an orthodontic programme.

**Mr. J. Pilbeam** thought that the meeting owed an apology to Mr. Cutler for discussing the Reports of the Committee rather than his paper, but if Mr. Cutler had not mentioned the Reports in his paper they probably would not have seen the light of day quite so soon.

He had enjoyed reading Mr. Cutler's paper very much indeed. If it had been written three or four years ago it would have been regarded as revolutionary, but during the last few years, owing to the Beveridge Report and now the White Paper on the health services, people were becoming more socialised in outlook and Mr. Cutler's recommendations did not appear so unusual.

One very interesting suggestion in the paper was that the Society should prepare a booklet setting out the reasons for orthodontic treatment, the general principles of the treatment, and so on. Personally he thought that would be a splendid piece of work for the Society to do. It was not a booklet that should be published in war time, because it was no use encouraging people to seek orthodontic treatment when there were not sufficient orthodontists available to give it to them, but it could be written now so that it would be ready for publication at the right time. He thought that it would be rather expensive for the Society to carry out alone, and he would suggest that it should seek the co-operation of the Central Council for Health Education, which was a Government body set up to educate the people in health matters. He thought that the Central Council would be glad to receive such an interesting proposal from the Society.

He also supported Mr. Cutler's suggestion that orthodontic specialists or those who practised orthodontics as the main section of their work should have a small star placed against their names in the list of members of the Society. As Mr. Cutler had said, membership of the Society did not imply that the member was an expert orthodontist but merely that he was interested in orthodontic study.

With regard to the Committee which had been appointed by the Council, its membership had been so arranged as to give representation to the various sections of the profession interested in orthodontics. There were on the Committee four orthodontic specialists, three of whom were teachers; one private practitioner who did a great deal of orthodontic work and whose capabilities could be regarded as equal to those of a specialist; and one public dental officer. He mentioned the composition of the Committee because in two of the replies received from the hospitals it had been suggested that the matter of education should be considered by people better qualified to undertake the task, and he thought that was a somewhat uncharitable remark, especially as there were on the Committee four of the best orthodontic specialists in the country.

The Committee had considered the problem of orthodontic education for some time, and, in discussing that subject, several members of the Committee had had in mind the difficulty in which orthodontics was now placed in relation to the public. As the members of the Society knew, there was not a full orthodontic service for the public and there were very few orthodontic specialists available. Why was it that, after so many years of orthodontic teaching, there were so few orthodontic specialists available to the public? It could not be a question of the fees for orthodontic treatment being inadequate. Generally speaking, the fees paid for orthodontic treatment by the people who could afford it were considerable. Some local authorities were very interested in providing an orthodontic service for the school children in their areas, but they found they could not obtain orthodontists of sufficient experience to take such appointments, which were reasonably well paid. It was therefore rather strange that, in spite of the number of students who qualified each year, the number of orthodontists was so small. It rather suggested that the orthodontic teaching was wrong, and he thought the fault of the teaching was that it was too practical. Before a student could be made really interested in orthodontics he must be given a good scientific background, which would provide him with the fundamentals that were essential for the proper study and application of a speciality such as orthodontics. The reason why there were two Reports was that the majority of the members of the Committee thought that there must be more scientific training in the orthodontic course if sufficient orthodontists were to be provided in the future, whereas the minority did not quite hold that view.

He thought that 55 per cent of the schools were not in favour of the Part II syllabus proposed by the Committee, their argument being that the student was not sufficiently educated in dental subjects to



be able to decide whether he should take Part II or not. Some of the schools had suggested that that was a weak point in the Report, but personally he thought it was a very good thing to have an optional section. In medicine there were optional subjects, and he did not see why there should not be an optional course in dentistry. Some people argued that there was not time for the optional course, but he thought that if a student was keen on orthodontics and wanted to specialise in it he would make a great effort to take Part II of the syllabus. This would be of considerable advantage to teaching in the schools, because the more scientific and the less practical work that was done by students would mean the appointment of more demonstrators, but the difficulty was to find the teachers. When a house surgeon was required in the children's department, obviously a dentist would be selected who had taken the Part II optional course, because that would indicate that he was keen on the subject of orthodontics and had more knowledge of it than other people recently qualified, and similarly when a demonstrator was required a man would be chosen who had taken the Part II course and had been a house surgeon in the children's department. The course would stimulate people to concentrate on orthodontics and it would enable dental surgeons who were keen on the subject and who had had the necessary scientific training to advance to higher teaching appointments.

Some of the schools had suggested that there was far too much theory and not enough practical work in the course, and one or two schools had mentioned the fact that a number of students who took the B.D.S. examination failed in medicine simply because it was taught from the book and not from the practical standpoint. That might be true, but orthodontics was not in the same position. The Committee suggested that a greater length of time should be spent on the scientific training but also suggested that the students should watch specialists doing practical work, and from that they should learn a great deal. If students taking the B.D.S. examination were able to attend more frequently in the out-patients' department and also attended more clinical lectures they would not be likely to fail in the medical part of the examination.

The two Reports had been sent to all the schools, and only one school had not replied. Generally speaking, 61 per cent of the schools approved of the syllabus, 3 per cent were definitely opposed to it, and 55 per cent were opposed to Part II. On reading through all the replies from the schools he had been disappointed in them. The schools were keen on saying exactly what they did themselves, but they devoted very little attention to answering the questions put to them, in which they were asked to give their general observations on the Report and to say whether the suggestions it contained would be suitable.

With regard to the question of the school dental officer, Mr. Chapman had said that the field of the school dental officer was restricted and that orthodontics could therefore be included in that field. He quite agreed with that up to a point, but it must be remembered that the Report was based not on present-day circumstances but on what the Committee thought would happen in the future. For instance, he did not visualise the school dental officer of the future doing the same work as he did to-day. He would probably be a public dental officer, doing work for children and adults and perhaps doing hospital work, so that his field of work would be increased and he would probably be unable to find much time for orthodontic treatment. That was why he thought it was so important to base the Report on the production of orthodontic specialists, who had a good scientific knowledge of the subject.

With regard to the post-graduate course, the Committee suggested that it should be a diploma course of one academic year. He did not think that such a comprehensive subject as orthodontics could be adequately taught from a post-graduate point of view in less than one academic year, and he did not think it would do anyone much good to take a



shorter course. If there had been a good post-graduate course years ago he would have been very glad to take it. He had taken one post-graduate course, and all it had consisted of was a recital of what the lecturer did to put teeth straight, and so on. There had been little in the course about diagnosis. There was undoubtedly a great need for further orthodontic teaching, and he was glad that the Committee had decided that the post-graduate student should take a course of a full academic year.

Mr. Chapman and Mr. Rix had suggested in their Minority Report that post-graduate instruction should be given at centres, such as hospitals. That would be very good up to a point, but he would prefer to see orthodontic teaching given in a post-graduate school which was apart from all hospitals, because he thought the great difficulty of post-graduate teaching at hospitals was the inbreeding of knowledge, the same theories being taught year after year and generation after generation. When an independent centre was set up people came to it from different hospitals and formed a unit, which infused new thought, new lines of research, and a new orientation of education.

**Mr. R. Cutler** said he was glad that most of the discussion had been about the activities of the Committee and not specifically in reference to his paper. He had asked a friend of his who was a special constable what his technique was when he was called to a brawl, and his reply had been that he had asked the advice of a member of the regular police force, who said that the best plan to adopt was to walk rather slowly to the scene of the disturbance, as then by the time he reached the contestants they would probably have knocked each other out. He thought that had happened on the present occasion and his own task was a relatively simple one.

With regard to the Special Committee, he was glad that some appreciation had been expressed for the efforts of those serving on it. It might be remembered that in his paper he had said that the Committee had been formed at the suggestion of a member of the Council, but he had not said that that member was himself, partly from natural modesty and partly because he was afraid the members of the Committee might curse him roundly for having involved them in such a tremendous amount of work. He was not at all sure that the members of the Society in general realised the number of hours that the Committee had spent on making the progress which it had made. In their private affairs and particularly in their private professional affairs they were so used to making immediate decisions and judgments which were entirely satisfactory to themselves that when a matter of general importance arose it was fatally easy to pass snap judgments which might be neither fair nor fully adequate to the issues involved. The creaking machinery of democracy showed to very poor advantage in general discussions, and before the members criticised the lack of progress of the Committee he would point out that the progress which had been made already had been achieved only by the expenditure of a very considerable amount of time and effort by men who were extremely busy in their normal spheres of work.

Since the publication of his address the Government White Paper had been issued, which was interesting in so far as the medical profession was likely to retain a considerable measure of freedom. The members might recollect that he had foreshadowed that in his address. Further, it was admitted in the White Paper that the scarcity of dentists prevented any very general application of regimentation to the dental profession, and he had indicated that also in his address. The members should therefore have ample opportunities to thrash out such matters as they had been discussing that evening, to the satisfaction of all, and they should regard the present discussion as by no means final but as capable of being continued until all the problems were solved. It was more than ever clear that private practice would continue for many years; indeed, it would and could die only when Government



practice became as attractive in every aspect as the best type of private practice was today. As Government practice in dentistry could not start until sufficient dentists were available, much less compete on level terms with private practice, it was clear that dentists had a considerable breathing space in front of them, and in their discussions and framing of policy they should not ignore the considerable length of time which could be allowed to elapse before final decisions had to be made.

With regard to education and teaching, it was his experience that there was always a state of stress and strain between the senior academic body and the junior teachers, and, even if the hotheadedness of youth were discounted, there was often some truth in the arguments of those who were in daily contact with the students themselves. In general, if a proposal was put to an academic body the answer, if in the negative, was usually said to be in the negative for one of the following reasons: "(a) because it cannot be done," "(b) because it was tried years ago and failed," "(c) because X is in charge of the department and he is such a good fellow that we cannot alter it for you." That attitude, of course, was to some extent due to the fact that up to the present time academic bodies had not been submitted to the survive or perish test which constantly confronted the board of, for example, a business firm, and there was no doubt that it was far more easy for suggestions to be considered and adopted by a business firm in active competition with its rivals than it was for them to be considered and adopted by an academic body, and, as a result of the difficulty in the latter case, training and organisation tended to become static. It might be an impertinence for him, as a private practitioner, to offer advice on the matter, but he believed that there still remained a distinct possibility of Government interference with teaching policy in the future, if only to encourage and speed up the training of dentists, and a more liberal and elastic approach to such problems as were facing dentists now might prove to be necessary. He would at all times encourage the junior members of the teaching profession to take every opportunity of making their voice heard in such matters.

The question whether it was essential that there should be strict uniformity in what should be taught and generally adopted was a debatable point, and the very fact that widely divergent views were held on the subject of undergraduate teaching rather suggested that considerable liberality of method as between one institution and another might be a good thing, quite apart from the fact that knowledge was itself not static and many of the basic conceptions in orthodontics might well need further revision in the light of research and experiment.

The object of his paper was not primarily to invite discussion, because it dealt chiefly with facts which could not be disputed or argued about very much, but he felt that in the present turmoil, which was likely to continue, orthodontists might at any time be rushed into decisions by public clamour for investigation of this or that aspect of their work, and he felt that the clearer they were in their own minds as to what they were doing and what they could do the better would they be able to deal with such problems when they arose. It had, of course, been easy for him to play the part of an armchair critic (though he did not think his criticisms had been far off the mark), but he had served a long and hard apprenticeship to orthodontics and he retained sufficient love for it to wish its aims to be furthered to the utmost, and, however much orthodontists wished for action and the formation of an orthodontic second front, discussion and planning must certainly come first.

## THE BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS

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*The Report of the Special Committee appointed by the Council of the Society to consider the orthodontic treatment of elementary school children and post-graduate orthodontic teaching.*

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### MEMBERS OF THE COMMITTEE.

J. F. PILBEAM, L.D.S.Eng., *Chairman* ; Senior Dental Officer, Middlesex County Council.

HAROLD CHAPMAN, L.D.S.Eng., Hon. Dental Surgeon, London Hospital; Examiner in Orthodontics, University of London ; Lecturer on Orthodontics, London Hospital Dental School.

SHELDON FRIEL, B.A., M.Dent.Sc., Sc.D.Dublin, Professor of Orthodontics, Trinity College, Dublin ; Examiner in Orthodontics, University of Dublin and Queen's University; Belfast.

NORMAN GRAY, H.D.D.Edin., L.D.S.Liv., Hon. Dental Surgeon, Princess Alice Memorial Hospital ; Dental Surgeon, St. Mary's Hospital, Eastbourne.

ERNEST RIX, M.R.C.S.Eng., L.R.C.P.Lond., L.D.S.Eng., Assistant Dental Surgeon, Children's Dept., Guy's Hospital.

LILAH CLINCH, L.D.S.Irel., *Secretary* ; Orthodontist, London County Council ; Orthodontic Assistant, Children's Hospital, Birmingham.

The Committee are indebted to Mr. H. T. A. McKeag for advice.

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This Report has been approved by the Council of the Society and signed by the majority of the Committee, namely :—

Mr. J. F. Pilbeam, *Chairman*.

Professor S. Friel.

Mr. N. Gray.

Miss L. Clinch.

Mr. H. T. A. McKeag supported the majority.

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TERMS OF REFERENCE.—To make proposals for :—

(a) The orthodontic treatment of children attending elementary schools.

(b) Postgraduate orthodontic teaching.



1 The British Society for the Study of Orthodontics, which is the Society concerned with orthodontics in Great Britain and Ireland, submits the following observations on the organisation of post-graduate teaching and the provision of orthodontic treatment for elementary school children.

2 It is important that all children suffering from malformation of the jaws and irregularity of the teeth should have an opportunity for expert advice or, if necessary, treatment. The high cost of treatment by private practitioners is an insuperable barrier for the great majority of children in attendance at public elementary schools and provision for free or partly free treatment on a suitable scale should be made by local authorities.

3 The first orthodontic scheme was started many years ago in the Borough of Heston and Isleworth, and this lead was soon followed by Croydon and Cambridge. In recent years three County Authorities have organised orthodontic schemes : viz., the London County Council, Hertfordshire and Middlesex. In many areas, both county and borough, a considerable number of children receive treatment for simple dental irregularities of the jaws and teeth, although individually these authorities may not have complete schemes. The teaching hospitals, the Eastman Dental Clinic, The Hospital for Sick Children, Great Ormond Street, The Children's Hospital, Birmingham, and the Birmingham General Dispensary have orthodontic departments where a limited number of cases are treated.

4 It has been shown quite conclusively that the employment of specialists by the London County Council has resulted in a greatly improved orthodontic service.

5 Untreated malocclusion can be harmful to the health of both the child and the adult. Although teeth in well-formed jaws are also subject to disease, there must be a greater tendency to dental ill-health when teeth are not in alignment. Excessive protrusion of the teeth and a recessively placed lower jaw upsets the balance of facial harmony, and this may have a disturbing effect on mental makeup, resulting perhaps in infelicity and a leaning towards an inferiority complex. Nasal and dental deformities are frequently associated. Many ear, nose and throat surgeons refer all cases showing these symptoms to dental surgeons for advice. The orthodontist can be of great assistance to the speech therapist, as difficulties in speech are sometimes caused by misplaced teeth.

6 While a few investigators have reported a high incidence of malocclusion in elementary school children, there is also reliable information to be found that treatable dental deformities are about 5 per cent of the school population. In the published Annual Report of 1937 of the County Borough of Croydon, out of 17,747 children examined 583 (i.e. 3.2 per cent) were referred for orthodontic treatment. In the Annual Report of 1941 of the Middlesex County Council an average of 7 per cent was referred for orthodontic treatment. In one London County Council district, in 9 months of 1934 1,004 children were examined, of whom 3.7 per cent were found to require treatment.

7 Although some children can be treated by the extraction of teeth and others by appropriate muscle exercises, sometimes needing no subsidiary orthopractic attention, it is estimated that about 5 per cent of the children need protracted treatment with fixed or removable appliances. The number of new entrants into the schools each year is approximately 500,000 (England and Wales), and 25,000 of these would need orthodontic treatment. The maximum number of new cases which could be started by one whole-time orthodontist in one year is 250. Thus we estimate that 100 orthodontists would be needed for a comprehensive school orthodontic service. At present there are

only three orthodontists employed on a part-time basis in the school service, and much will have to be done to encourage dental surgeons to specialise in the practice of orthodontics before all local authorities can hope to have a specialist service for treating dental deformities.

8 The model scheme of lectures for undergraduate education in orthodontics which is also submitted has divided the course into two parts. Part 1 is taken by all students, but does not include instruction in remedial treatment or technique. Part 2 is an optional course, and includes a small amount of remedial treatment and technique. It is essential that all students should receive a survey of the subject of orthodontics as a whole and undertake a detailed study of those parts that will enable them to recognise malformations in their early stages. Accordingly, orthodontic treatment in the school dental service should be conducted by specialists who have received an adequate post-graduate training. It is not possible to include a full training in orthodontics in the undergraduate course because :—

- (a) The necessary range and volume of knowledge and skill for the satisfactory practice of orthodontics cannot be acquired in the time available in the undergraduate course.
- (b) The majority of students have not the aptitude or inclination to undertake orthodontics.

9 The limited orthodontic treatment now available for the population as a whole, as mentioned in paragraph 3, is mainly on account of the small number of trained orthodontists. In spite of the need for post-graduate teaching in orthodontics, no organised post-graduate course for the training of specialists is available. Orthodontists either have gone abroad for training or have made private arrangements for tuition by established specialists. The expense of the former course limits the number who can undertake it. The latter course also puts limitations on the numbers and involves a kind of training that is limited in scope and value.

10 The first step then in preparation for a comprehensive scheme of orthodontic treatment is the provision of post-graduate teaching facilities in order to train more orthodontists. There are two possible approaches to this :—

- (a) By making provision for post-graduate training in dental schools generally.
- (b) By making provision for orthodontic post-graduate training at one or two special centres.

11 The dispersal of effort involved in (a) in view of the few teachers available and the number of students, would make it certain that if all or even a moderate proportion of the existing dental schools attempted to provide post-graduate facilities, none could become first-class for many years.

12 The concentration of effort in (b) would enable satisfactory courses to be provided in the most suitable conditions. The difficulty in selecting a particular institution would be great, and weight would have to be given to the staff and facilities available.

13 A post-graduate school for orthodontic teaching should be connected with a dental hospital and associated with a University. The connection with a University would make it possible for instruction to be given by members of the University on essential subjects outside the realm of the hospital dental staff. The course should take one academic year of whole-time instruction, and a diploma should be granted. The granting of a diploma would ensure that the qualifications of orthodontists would be of a minimum standard. This is a *sine qua non* for practitioners and teachers in dental schools.



14 The education of an orthodontist requires that he should be taught the material that would enable him to :—

- (a) Recognise the nature of a malformation.
- (b) Recognise ætiological factors.
- (c) Treat cases of malformation.
- (d) Understand current orthodontic literature.
- (e) Undertake research.

15 A research department should be an essential part of a post-graduate orthodontic school, not only for training students in the elements of research but also to carry on research into diagnosis, ætiology and prevention of malocclusion. The director of the school should have facilities to visit post-graduate schools and research departments in other countries to keep in touch with developments of research.

#### *Objects of Course.*

16 Training of orthodontists for the school dental service, private practice, teaching in dental schools and research work.

#### *Duration of Course.*

17 One academic year whole time. This is the minimum time necessary to give adequate instruction in the orthodontic and contributory subjects and to afford sufficient experience of the progress of cases under treatment.

#### *Entrants.*

18 Preference should be given to graduates who have had a good dental school record and whose qualification has been recently obtained.

#### *Diploma.*

19 A diploma after examination should be granted to those obtaining the required standard. Examinations should be held on theoretical subjects. Account should be taken of clinical work done and of theses and reports on research carried out during the course.

*The curriculum of the course, and details of the staff, accommodation, equipment and estimated cost of the post-graduate school are appended at the end of this report.*

20 It is recommended that where possible orthodontic treatment should be carried out in Health Centres, where the orthodontist can work in collaboration with dental and medical officers, rhinologists, radiologists, etc. In rural districts these centres should be in the principal market towns and where necessary travelling allowances should be made to patients to eliminate excessive travelling for the dental and medical staff.

21 Preventive orthodontics must be a part of the ordinary school dental service, and adequate provision must be made to preserve the deciduous dentition. Early loss of the deciduous teeth or the first permanent molars may produce irregular dentitions or, where irregularities already exist, may complicate treatment, making a good result impossible.

22 The standard of children's dentistry is not satisfactory, and it is recommended that a special course in pædodontics should be included in the curriculum of all the dental schools.

## Appendix

## PROPOSED POST-GRADUATE ORTHODONTIC SCHOOL.

*Curriculum of Course.*

Lectures and clinical or laboratory instruction in:—

- (a) Genetics. Dental embryology. Œcology. Physiology of bone and muscle. Endocrinology. Otorhinolaryngology. (Attendance at a children's ear, nose and throat department of the Out-patients of a teaching hospital should be included.) Dietetics. The dentition throughout life (lectures and clinical instruction to be given by an experienced dental surgeon).
- (b) History of Orthodontics. Development of the dentition, normal and abnormal. Œtiology, diagnosis and treatment of malocclusion. Appliance design and technique. Clinical teaching.

The lectures on the subjects under heading (b) would be given by the members of the orthodontic school staff.

*Staff and Salaries.*

	<i>Minimum salaries.</i>
Director ... ..	£1,500 per annum
Senior Assistant ... ..	£1,000 „ „
Junior Assistant ... ..	£800 „ „
Radiographer ... ..	£250 „ „
Mechanic ... ..	£300 „ „
Laboratory Assistant (Model Construction) ...	£150 „ „
Dental Attendant ... ..	£160 „ „
Secretary ... ..	£250 „ „
Selected Lecturers on : Genetics, Œcology, Embryology, Physiology of bone and muscle, Endocrinology, Otorhinolaryngology, Dietetics, The dentition throughout life ...	£500 „ „

Total Salaries (estimated cost)... £4,910 per annum

It is estimated that this staff could train 18 students each year.

*Accommodation.*

Clinical department.	Director's room.
X-ray and photographic department.	Staff room.
Mechanical laboratory.	Common room.
Research laboratory.	Office.
Library.	Waiting rooms, etc.
Lecture room.	

*Equipment.*

Dental chairs, spittoons, bracket tables, cabinets, electric-engines, table and hand lathes, orthodontic instruments, etc., X-ray, and photographic apparatus, welders, materials.

Research laboratory equipment:—

Microscopes, etc., Broadbent-Bolton X-ray cephalometer, photographic apparatus, gnathostatic and anthropometric instruments, muscle dynamometers.

Mechanical laboratory equipment.

*Full Estimated Cost of Proposals:*

Salaries ... ..	£4,910 per annum
Rent of accommodation ... ..	£800 „ „
Library ... ..	£100 „ „
Research department ... ..	£500 „ „

TOTAL ANNUAL EXPENDITURE, £6,310.

CAPITAL EXPENDITURE ON EQUIPMENT, £5,000.

THIS REPORT WAS SUBMITTED TO THE INTERDEPARTMENTAL COMMITTEE ON DENTISTRY. ORAL EVIDENCE WAS GIVEN BY MISS CLINCH, PROFESSOR FRIEL AND MR. GRAY AS APPOINTED MEMBERS OF THE SOCIETY.



**Mr. R. Ernest Rix and Mr. Harold Chapman, members of the Special Committee, were not in agreement with the Report and their comments are as follows:—**

1. We, two members of the Committee, differ from the majority upon certain items of their report: our major differences are hereunder.

#### THE POST-GRADUATE SCHOOL.

2. We think that the capital outlay and large annual expense proposed for training orthodontists is unnecessary and that a scheme of such scope should evolve as experience dictates. We therefore make the recommendations which follow.

3. The post-graduate instruction should be given at one centre, e.g., The Eastman Dental Clinic or a dental school possessing the necessary accommodation.

4. The qualified dental members of the orthodontic staff should be on a part-time basis, their remaining time being spent in private practice, which we believe would be advantageous to them in training others.

5. The expenses of the school should be defrayed by students' fees, patients' fees and, if necessary, grants.

6. There will be an adequate number of patients for the school at the outset, but it may be necessary to make arrangements to ensure a sufficient number when all children receive treatment in school clinics. This also applies to the supply of patients to the teaching schools.

#### TRAINING OF POST-GRADUATE STUDENTS.

7. Most orthodontic treatment involves the use of appliances which fall into two groups:—

(a) Removable.

(b) Fixed.

8. We recommend two courses of training:—

(i) For the use of (a), which may be completed in three months.

(ii) For the use of (a) and (b), which may be completed in six months. This course includes the former.

9. We visualize courses of instruction in which the teaching is based on practice and in which theory, remote from practice, is not included. In our opinion experience in dental practice before beginning either course would be very valuable; lectures cannot replace this.

10. No amount of training or teaching can create an experienced orthodontist, but, in order to accelerate the gaining of experience, students should return to the school for one to four weeks every one, two or three years to see the progress and results of treatment, immediate and remote of cases in the school: this will also provide the opportunity for further instruction: both are invaluable.

11. The number of cases in group (b) does not exceed 25 per cent, probably half this percentage is nearer the correct figure; not more than 25 per cent of the total number of students will require the six months' training to enable them to treat all cases; the remaining students will be competent to treat cases in group (a) after three months' training; these cases require less of the orthodontist's time than those in group (b).

12. We recommend two groups of practitioners :—

- (a) Those who have received three months' training who would practise children's dentistry, including orthodontics.
- (b) Those who have received six months' training and would practise orthodontics exclusively.

The treatment provided by the latter group requires more of the operator's time per patient than conservative treatment over the period of orthodontic treatment.

13. We recommend that eighteen orthodontists be trained in group (a) (six every three months for three periods, the fourth period allows for vacations), and six in group (b) per annum.

#### TREATMENT OF ELEMENTARY SCHOOL CHILDREN.

14. We consider that it is not necessary, practical or economical for all orthodontic cases to be treated by specialists in the exclusive practice of orthodontics.

15. Our proposals make less demands on the professional time of teachers and students for education than those of the majority report.

16. Our proposals make less demand on patients' and operators' time for orthodontic treatment by increasing its availability, because 95 per cent of all children need routine dental treatment and will be more accessible to a dental surgeon than to an orthodontist.

17. For the reasons given in paragraphs 15 and 16, more time will be available for routine dental treatment—a positive health service—required by 95 per cent of school children as compared with the 5 to 10 per cent requiring orthodontic treatment.

18. The authorities seem to have insufficient staff to give a number of children in their care the conservative treatment they need : there is a demand for dental surgeons for this work as well as for orthodontic treatment, for which a healthy mouth is essential.

19. It is not practicable for those practising orthodontics exclusively to be available for children in remote areas because they must practise in centres where there are sufficient cases to enable them to use their additional training constantly : such practice would correspond to that of specialists in private practice.

20. We are concerned to make the best use of the available dental personnel for the health of elementary school children. It is our opinion that these recommendations will accomplish this end.

21st Feb., 1944.



# THE BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS

## UNDERGRADUATE EDUCATION IN ORTHODONTICS

### The Final Report of the Special Committee appointed by the Council of the Society

#### Members of the Committee

J. F. PILBEAM, L.D.S.Eng., Chairman, Senior Dental Officer, Middlesex County Council.

HAROLD CHAPMAN, L.D.S.Eng., Hon. Dental Surgeon, London Hospital ; Examiner in Orthodontics, University of London ; Lecturer on Orthodontics, London Hospital Dental School.

SHELDON FRIEL, B.A., M.Dent.Sc., Sc.D.Dublin, Professor of Orthodontics, Trinity College, Dublin ; Examiner in Orthodontics University of Dublin and Queen's University Belfast.

NORMAN GRAY, H.D.D.Edin., L.D.S.Liv., Hon. Dental Surgeon, Princess Alice Memorial Hospital ; Dental Surgeon, St. Mary's Hospital, Eastbourne.

ERNEST RIX, M.R.C.S.Eng., L.R.C.P.Lond., L.D.S.Eng., Assistant Dental Surgeon, Children's Dept., Guy's Hospital.

LILAH CLINCH, L.D.S.Irel., Secretary ; Orthodontist, London County Council ; Orthodontic Assistant, Children's Hospital, Birmingham.

The Committee are indebted to Professor J. C. Brash and the late Dr. George Northcroft for advice.

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This report has been approved by the Council of the Society and signed by the majority of the Committee, namely :—

Mr. J. F. Pilbeam, Chairman.

Professor S. Friel.

Mr. N. Gray.

Miss L. Clinch.

TERMS OF REFERENCE.—To make proposals for the teaching of Orthodontics to undergraduates.

The Committee recommend that :—

1. The report be sent to all universities and colleges in Great Britain and Ireland which have a dental school or give a dental degree or diploma ; to all dental hospitals in Great Britain and Ireland ; to the General Medical Council ; the Dental Board of the United Kingdom ; the Dental Education Advisory Council, and the Dental Hospitals Associations.

2. The scheme of lectures, clinical and technical instruction in Part I (a) and (b) should be the minimum taught to dental students.

3. (a) There should be a special examination in Orthodontics and the examiners should be specialists or have a special knowledge of Orthodontics.

(b) Examining bodies should confine the orthodontic examination to Part I of the proposed course.

(c) The Orthodontic Department in dental schools should be in charge of a specialist or a person with a special knowledge of Orthodontics.

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## Majority Report

### Proposals for the Teaching of Orthodontics to Undergraduates

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The course should be divided into two parts.

#### *Part I.*

Part I (a) and (b), to be taken by all students. Part I (a) should include at least fifteen lectures. Part I (b) should include a minimum of fifteen hours clinical teaching in diagnosis, preventive treatment, remedial treatment, and technique.

#### *Part II.*

Part II, to be taken at the student's option, should include, in addition to Part I, lectures on treatment, instruction in orthodontic technique, clinical teaching and the treatment of patients.

Reasons for the division of the course into two parts :—

1. The length of time that can be allocated to orthodontic teaching is limited.

2. To serve the best interests of the public the necessary requirements are a knowledge of :—

(a) Early diagnosis.

(b) Prevention.

(c) Prognosis.

(d) Age for treatment.

Part II enables students to learn additional treatment.



**Model Scheme of Lectures and Clinical and Technical  
Instruction for Undergraduate Education in Orthodontics**

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TABLE OF CONTENTS

PART I (a) COMPULSORY.

*Lectures*

- I. DEFINITION.
- II. NORMAL DEVELOPMENT OF THE DENTITION.
- III. ABNORMAL DEVELOPMENT OF THE DENTITION.
- IV. AETIOLOGY OF ABNORMAL DEVELOPMENT OF THE DENTITION.
- V. DIAGNOSIS.
- VI. PROGNOSIS.
- VII. PREVENTIVE TREATMENT.
- VIII. REMEDIAL TREATMENT.

PART I (b) COMPULSORY.

*Clinical and Technical Instruction.*

- I. CLINICAL TEACHING OF DIAGNOSIS INCLUDING SERIAL EXAMINATION OF UNSELECTED CHILDREN.
- II. CLINICAL TEACHING OF PREVENTIVE TREATMENT.
- III. CLINICAL TEACHING OF REMEDIAL TREATMENT.
- IV. TECHNICAL TEACHING.

PART II OPTIONAL.

- I. REMEDIAL TREATMENT.
- II. TECHNIQUE.

## PART 1(a)

*Lectures*

## I. DEFINITION :

Orthodontics is the department of Dental Science and Practice concerned with the treatment of malocclusion, i.e., abnormal position and/or relation of the teeth.

It is based on (1) the study of the normal development and growth of the face and jaws as they affect the positions of the teeth ; (2) the study of the aetiology and prevention of malocclusion ; and (3) clinical experience.

## II. NORMAL DEVELOPMENT OF THE DENTITION.

*The student of orthodontics must co-ordinate his knowledge of Anatomy, Physiology and Dental Anatomy, and make a more detailed study of these subjects as related to the Function Anatomy of the Jaws and Teeth.*

*The student has already studied Anatomy, Physiology, and Dental Anatomy. Orthodontics, however, require more detailed treatment of some parts of these subjects. It is concerned with the developing child and requires additional knowledge of the changes in bone and muscle growth and the positions and relations of the teeth and jaws to that commonly taught by the anatomist. The application of these subjects to the developing child is part of the basis of orthodontics and this application can only be taught by an orthodontist.*

A. Development and growth of the jaws and associated bones, and the development of occlusion. Positions of crypts and positions of the teeth in their crypts.

(a) Ante-natal.

- (b) Post-natal. (1) Before eruption of teeth.  
(2) Deciduous Dentition.  
(3) Mixed Dentition.  
(4) Permanent Dentition.

B. Factors influencing the arrangement of the teeth.

(1) Bone Growth.

- (a) Description of bone as a tissue.  
(b) The mechanism of bone modification, cellular activity, deposition and absorption. Blood supply a necessary condition of bone cell activity.  
(c) Response to use.  
Effects of pressure and tension.  
Wolff's law.  
(d) Factors determining bone form.  
Heredity a dominant factor. The direction of functional stresses modifying genetically determined form ; habitual functional stress level determining density.  
(e) Special characteristics of alveolar bone as dependent on the presence of teeth.  
(f) The principles of skeletal growth and the mode of growth of the jaws.

(2) Muscle Action.

- (a) Group and counter group systems showing that muscles do not act singly.  
(b) Muscle less adaptable than connective tissue, e.g., bone.  
(c) Postural position of jaws, lips and tongue controlled by muscles.  
(d) Muscle tone.  
(3) Crypts and positions of the teeth in their crypts.  
(4) Time, direction and rate of eruption of teeth.  
(5) Approximal contact points.  
(6) Interdigitation of cusps.  
(7) Interdependence of jaws.



### III. ABNORMAL DEVELOPMENT OF THE DENTITION.

#### A. Defects of Bone.

- (1) Defects of proportion between the various parts of the face.
- (2) Defects of proportion between the size of the jaws and teeth.
- (3) Defects of relationship of the arches to one another and to the face.

#### B. Defects of Muscles.

#### C. Defects of position of teeth erupted and unerupted.

- (1) Placement.
- (2) Inclination.
- (3) Rotation.
- (4) Imbrication.
- (5) Separation.

### IV. ÆTIOLOGY OF ABNORMAL DEVELOPMENT OF THE DENTITION :

#### A. Congenital conditions.

- |                                 |  |
|---------------------------------|--|
| (1) Inherited                   | Defects of proportion between the size of jaws and teeth.  |
| (2) Developmental abnormalities | Defects of arch relationship.<br>Defects of form and size of teeth.<br>Supernumerary and missing teeth.<br>Cleft palate. |

#### B. Pathological conditions.

Possible effects of certain metabolic and infective disease.

#### C. Functional conditions.

e.g. Musculature. Habits.

#### D. Dietetic conditions.

Chemical. Physical.

#### E. Local conditions.

e.g., Caries and faulty restorations.

Premature loss or extraction of deciduous or permanent teeth followed by drifting of teeth.

Extensive early extraction of deciduous molars followed by closure of the jaws.

Retained deciduous teeth.

Trauma of teeth, jaws and soft tissues.

Trauma during labour.

More than one cause may produce the abnormal development. The effect of a cause may vary, due to the following factors :—

Duration and intensity of cause ; the stage of development ; and the resistance of the individual.

The ætiological factors taught should be based on evidence.

## V. DIAGNOSIS.

A. Case History.

B. Methods employed in diagnosis.

C. Classifications. There are various classifications but none is adequate. Students should use the correct nomenclature to describe malocclusion.

## VI. PROGNOSIS :

Age. Heredity. Social conditions. Health and personal characteristics. General condition of the mouth and teeth. Proportion between teeth and surrounding tissues.

## VII. PREVENTIVE TREATMENT.

(1) Care of deciduous and permanent teeth.

(2) Extraction of teeth :

(a) Retained deciduous.

(b) Supernumerary.

(3) Space retention after premature loss of deciduous and permanent teeth.

(4) Cure of bad habits.

(5) Exercises.

(6) Instruction on the possible effect of the following :—  
 Respiration. Tonsils and adenoids. Mastication. Diet.  
 Factors beneficial and harmful to health.

## VIII. REMEDIAL TREATMENT.

(1) Extraction of teeth.

(2) Mechanical or a combination of surgical and mechanical.

(a) Appliances and exercises to assist the development of function e.g., lip, tongue, and jaw exercises.

(b) Physiology of tooth movement.

Effects on bone and teeth of :—

i. Various degrees of pressure and tension.

ii. Periodicity of pressure and tension.

---

 PART I (b).
*Clinical Teaching and Technique.*

I. Clinical teaching of diagnosis, including serial examination of unselected children and models from two years of age.

II. Clinical teaching of preventive treatment.

III. Clinical teaching of remedial treatment, including treatment by extraction only and including the design, construction and insertion of appliances for the movement of a linguallly placid upper incisor or incisors over the bite.

IV. Technical instruction in the making of such appliances.

NOTE.—It is recommended that wire bending, spot welding and free-hand soldering be taught during the prosthetic course.



## PART II.

## I. REMEDIAL TREATMENT.

Factors influencing the time and type of treatment.

Surgical : Extraction of teeth and jaw resection.

Mechanical (or a combination of surgical and mechanical).

A. Appliances and exercises to assist the development of normal function, e.g., lip, tongue and jaw exercises.

B. Physiology of Tooth Movement.

Effects on bone and teeth of :—

- (1) Various degrees of pressure and tension.
- (2) Periodicity of pressure and tension.

C. Mechanical principles involved in the use of pressure.

- (1) Action and reaction.
- (2) Inclined planes.
- (3) Levers.
- (4) Elasticity.

D. Application of mechanical principles to orthodontic appliances.

(1) Analysis of appliances (fixed or removable) into :—

- (a) Framework—for distribution of action and reaction.  
(The framework may have a subsidiary purpose, to guide or protect springs or to act as a spring.)
- (b) Sources of pressure for tooth movement.
  - (i) Springs.
  - (ii) Rubber.
  - (iii) Muscles.
  - (iv) Miscellaneous.

(2) Methods of disposing of reactions.

- (a) Cancellation (reciprocal movement).
- (b) Resistance :
  - (i) Intra oral.
  - (ii) Extra oral (cranial).

E. General considerations in appliance design.

- (1) Stability.
- (2) Minimum interference with function.
- (3) Cleanliness.

F. Sequence in design of active appliances.

(1) Grouping of teeth for :—

- (a) Movement.
- (b) Resistance.

(2) Choice and detail design of source of pressure, including location of attachment point.

(3) Choice and design of framework, fixed or removable.

- (a) for primary purpose of distribution of action and reaction.
- (b) For secondary purpose such as protection of springs.

G. Design of passive appliance.

- (1) Utilising muscle pressure, e.g., an inclined plane cemented on lower incisors to move an upper incisor labially.
- (2) For retention of teeth in new positions.

H. Hygiene during treatment.

II. TECHNIQUE.

Materials, their special properties and uses in orthodontics.

Appliances, their construction.

Wirebending.

Soldering                      Bows, locks, attachments of springs.

Welding                        Bands and attachments.

NOTE.—The committee recommend that preliminary practical work should be carried out on the phantom head or on models.



# THE BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS

## UNDERGRADUATE EDUCATION IN ORTHODONTICS

### Minority Report

by Messrs. R. Ernest Rix and Harold Chapman

---

The following proposals differ from those of the majority report in broad and important principles but are identical in some details. The differences make :—

1. Treatment obligatory.
2. The syllabus of lectures free from subjects :—
  - i. which an orthodontist might not be expected to be the person best qualified to lecture on,
  - ii. whose bearing on orthodontics is insufficient to justify inclusion,
  - iii. which have already been taught, e.g., Biology, including the elements of genetics; Physics, including Mechanics and Anatomy, Physiology and Histology *vide* Regulations relating to the L.D.S. R.C.S.Eng., October 1st, 1938.
3. Provision for a course of study in which both theory and practice receive equal consideration.

Treatment limited to the movement of a lingually placed upper incisor or incisors over the bite, as proposed in the majority report, will give an inadequate perspective of the correction of malocclusion.

### Undergraduate Orthodontic Course

1. *Lectures.*
2. *Technique.*
3. *Clinical Teaching.*
4. *Treatment of Patients.*

#### 1. *Lectures.* Course of 12.

##### I. DEFINITION.

Orthodontics is the department of Dental Science and Practice concerned with the treatment of malocclusion, i.e., abnormal position and/or relation of the teeth

Treatment is based on (1) the study of the normal development and growth of the face and jaws as they affect the positions of the teeth; (2) the study of the ætiology and prevention of malocclusion; and (3) clinical experience.

## II. NORMAL DEVELOPMENT OF THE DENTITION.

- A. The growth of the face, its changing proportions, the changes in the dental arches, the position of crypts and of teeth in their crypts, the changes in the positions of the teeth and in the occlusion till the completion of the dentition.

The changes should be taught by means of lantern slides of serial models from birth to the completion of the dentition.

1. Before eruption of the teeth.
2. Deciduous dentition.
3. Mixed dentition.
4. Permanent dentition.

The lectures on the above are to supplement the lectures on general anatomy, physiology and dental anatomy by treating the subject in a detailed manner applicable to orthodontics.

- B. Factors influencing the arrangement of the teeth.

1. Bone :

- (a) Response to use.  
Effects of pressure and tension.
- (b) Factors determining bone form.  
Heredity a dominant factor.
- (c) The principles of skeletal growth and the mode of growth of the jaws.
- (d) Special characteristics of alveolar bone as dependent on the presence of teeth.

2. Crypts and positions of the teeth in their crypts.
3. Time, direction and rate of eruption of teeth.
4. Approximal contact points.
5. Interdigitation of cusps.
6. Interdependence of jaws.

## III. ABNORMAL DEVELOPMENT OF THE DENTITION.

- A. Defects in relation to bone.

1. Defects of proportion between the various parts of the face.
2. Defects of proportion between the size of the jaws and teeth.
3. Defects of relationship of the arches to one another and to the face.

- B. Defects of positions of teeth.

1. Placement.
2. Inclination.
3. Rotation.
4. Imbrication.
5. Separation.

Serial models of abnormal dentitions should be used in this connection.



## IV. ÆTIOLOGY OF ABNORMAL DEVELOPMENT OF THE DENTITION.

## A. Congenital conditions.

- |                                 |   |   |
|---------------------------------|---|---|
| 1. Inherited.                   | { | Defects of proportion between the size of jaws and teeth. |
|                                 |   | Defects of arch relationship.                             |
| 2. Developmental abnormalities. | { | Defects of form and size of teeth.                        |
|                                 |   | Supernumerary and missing teeth.                          |
|                                 |   | Cleft Palate.   |

## B. Pathological conditions.

Possible effects of certain metabolic and infective diseases.

## C. Functional conditions, e.g., Habits.

## D. Dietetic conditions.

Chemical. Physical.

## E. Local conditions.

Caries and faulty restorations.

Premature loss or extraction of deciduous or permanent teeth followed by drifting of teeth.

Extensive early extraction of deciduous molars followed by closure of the jaws, or lower prenatal occlusion or both.

Retained deciduous teeth.

Habits.

Trauma of teeth, jaws and soft tissues.

Trauma during labour.

More than one cause may contribute to malocclusion in any one case. The effect of a cause may vary, due to the following factors:—

Duration and intensity of cause.

The stage of development.

The resistance of the individual.

The ætiological factors taught should be based on evidence.

## V. DIAGNOSIS.

## A. Case history.

## B. Methods employed in diagnosis.

## C. Classifications. There are various classifications but not one is adequate. Students should use the correct nomenclature to describe malocclusion. Angle's and Bennett's classifications should be explained and adapted to present-day knowledge.

## VI. PROGNOSIS.

Age. Heredity. Social conditions. Health and personal characteristics. General condition of the mouth and teeth.

Proportion between teeth and surrounding tissues.

## VII. PREVENTIVE TREATMENT.

## A. Care of deciduous and permanent teeth.

## B. Extraction of teeth :—

(a) Retained deciduous.

(b) Supernumerary.

(c) Permanent.

## C. Space retention after premature loss of deciduous and permanent teeth.

## D. Cure of bad habits.

## E. Exercises.

## F. Instruction on the possible effects of the following :—

Respiration. Tonsils and Adenoids. Mastication. Diet. Factors beneficial and harmful to health.

### VIII. REMEDIAL TREATMENT.

Factors influencing the time and type of treatment.

Surgical Treatment.

Extraction of teeth and jaw resection.

Mechanical Treatment (or a combination of surgical and mechanical).

- A. Appliances and exercises to assist the development of function, e.g., lip, tongue and jaw exercises.
- B. Physiology of tooth movement.
 

Effects on bone and teeth of :—

  1. Various degrees of pressure and tension.
  2. Periodicity of pressure and tension.
- C. Applied Mechanics.
  1. Action and reaction ; resistance ; reciprocal action.
  2. Inclined planes.
  3. Levers.
  4. Elasticity.
- D. Design of appliances for :—
  1. Tooth movement by :—
    - (a) Springs.
    - (b) Rubber bands.
    - (c) Muscles.
    - (d) Miscellaneous.
  2. Resistance.
  3. Stability.
  4. Minimum interference with function.
  5. Cleanliness.
  6. Retention of teeth in new positions.
- E. Materials, their special properties and uses.
- F. Hygiene during treatment.

### 2. *Technique.*

Wire bending.

Free-hand soldering.

Welding.

Removable appliances and their stabilisation.

Fixed appliances.

### 3. *Clinical Teaching.*

Minimum of 15 hours.

- I. Diagnosis, including the examination of serial models from 2 years of age, supplemented by six monthly examinations of children if possible.
- II. Preventive Treatment.
- III. Remedial Treatment.

The teaching under this heading cannot be repeated too frequently. It should be given by an experienced orthodontist to a small class with patients, but it does not include operative procedures.

### 4. *Treatment of Patients.*

Minimum of 100 hours.



**Appendix**

ESSENTIAL DIFFERENCES IN THE MINORITY REPORT SIGNED BY  
R. ERNEST RIX AND H. CHAPMAN.

1. No part of the Syllabus should be optional. More treatment should be obligatory. Students should be examined on the whole Syllabus.
2. The theoretical instruction should be curtailed by excluding those subjects which are taught in other departments except where special knowledge is required for orthodontics.
3. The number of lectures should be 12 and more time given to Clinical Teaching. Technique should be a separate study.
4. A minimum of 100 hours should be allotted to the actual treatment of the patients by the student.

## REPORTS OF MEETINGS

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An Ordinary Meeting of the Society was held at Manson House, 26, Portland Place, London, W.1, on Saturday, 9th May, 1942, at 2 p.m., Mr. S. A. RIDDETT, President, occupying the chair.

The Minutes of the Annual General Meeting, held on 6th December, 1941, were read, confirmed and signed.

The PRESIDENT referred with regret to the death of two members of the Society, Mr. C. F. Rilot and Mr. D. H. Campion, and of an Honorary Member, Dr. Lundstrom.

Major Gerald Franklin, D.D.S.(Montreal), of the Canadian Expeditionary Force, was elected a member of the Society.

The PRESIDENT said he was pleased to see such an excellent attendance on the present occasion. He hoped that the visitors, some of whom were very distinguished, would take part in any discussion which might follow the paper.

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AN Ordinary Meeting of the Society was held at Manson House, 26, Portland Place, London, W.1, on Monday, 7th September, 1942, at 5.30 p.m., Mr. S. A. Riddett, President, occupying the chair.

The Minutes of the last meeting on 9th May, 1942, were read, confirmed and signed.

The President said he hoped that the visitors would take part in any discussions which might arise.

The following paper was then read : " Labour and Dental Deformities," by Sir F. Colyer, K.B.E., LL.D., F.R.C.S.

Short Communications were given by the following : Miss K. C. Smyth : " A Case of Thumb-sucking with Marked Changes in Occlusion." Mr. O. N. Catchpole : " Natural Improvement in Incisor Alignment." Mr. H. G. Visick : " An Unsuccessful Attempt to Move ' Depressed ' Deciduous Molars."

On the motion of the President, a vote of thanks was accorded to Sir F. Colyer, to those who gave short communications and to all those who took part in the discussions, and the meeting then ended.

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### ANNUAL GENERAL MEETING, 1942.

The Annual General Meeting for the year 1942 was held at Manson House, 26, Portland Place, London, W.1, on Saturday, 5th December, 1942, at 2 p.m. The President, Mr. S. A. Riddett, occupied the Chair.

The Minutes of the last Ordinary Meeting, held on Monday, 7th September, 1942, were read, confirmed and signed.

On the motion of Mrs. L. LINDSAY, a vote of thanks was accorded to Mr. Riddett for his services as President.

#### REPORT OF THE HONORARY TREASURER

The Council had decided that no subscription be payable for 1942.

The income for the year was £15 19s. 8d., derived entirely from interest on investments.

Expenditure for the year was £65 4s. 4d. Deficit £49 4s. 8d.

The only outstanding liabilities are the 1940-41 and 1942 *Transactions*, cost of the Annual General Meeting, 1942, and expenses in connection



with the Committee considering orthodontic teaching. These liabilities may total £80.

The Society's Insurance Policy for Fire, Burglary, etc., has again been increased by 25 per cent, the total amount for fire insurance now being £593 15s., burglary, £62 10s. and all risks insurance, £31 5s.

The War Damage claim for £39 19s. has been settled and the Society's property continues to be insured under the War Damage Act, 1941, the premium being paid up to March, 1943.

The value of the Society's investments as at 17th November, 1942, is £1,218 11s. 5d. and the assets total £1,215 12s.

In addition, the Society owns three cabinets for the keeping of models, and other furniture, etc. worth to-day £630.

The Honorary Treasurer's Report was received and adopted.

#### REPORT OF THE HONORARY SECRETARY

Mr. R. CUTLER (Hon. Secretary) said that the 1940-41 *Transactions* had been circulated to members, together with the list of members, which had been kept as up to date as possible.

In view of the increasing tempo of the progress of the war, the Council had kept a close watch on the general situation in so far as it might affect the well-being of the Society and would at all times be pleased to consider suggestions from and to hear the views of members, so that it could act in accordance with their wishes as far as was practicable and as far as those wishes might be in accord with the national interest.

The President had referred to the new development in the formation of a Special Committee to report upon and make proposals regarding orthodontic matters. That Committee had already started work.

On the motion of Mrs. L. LINDSAY, seconded by Mr. G. JOHNSON, the report of the Hon. Secretary was received and adopted.

#### REPORT OF THE HONORARY CURATOR

Mrs. L. LINDSAY said that Miss Clinch, the Honorary Curator, had asked her to state that there was nothing new to report in regard to the Museum, except that a set of models had been presented by Mr. Visick.

#### REPORT OF THE HONORARY LIBRARIAN

Mr. A. G. TAYLOR (Hon. Librarian) said that some of the books had been damaged but all of them had now been collected and were in the gallery of the hall in which the present meeting was being held, with the exception of one set of *Transactions*, which was kept in another place, in view of possible enemy action. There had been no additions to the Library during the year.

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The Annual Demonstration Meeting of the Society took place in London on 3rd May, 1943, when there was an average attendance of members.

The demonstrations were particularly interesting and the President felt that a short account of each demonstration should be published in order that those present would have an opportunity for further study of the practical suggestions given by the demonstrators. Moreover, a printed report enables those members unable to be present to read accounts of the demonstrations. The demonstrators themselves will probably welcome this innovation since each is busily engaged in explanation which affords no opportunity to see or hear what other demonstrators are exhibiting.

An Ordinary Meeting of the Society was held at Manson House, 26, Portland Place, London, W.1, on Monday, 27th September, 1943, at 4.45 p.m. In the absence of the President, the Chair was occupied by Mrs. Lindsay.

The Minutes of the Ordinary Meeting held on Monday, May 3rd, 1943, were read, confirmed and signed.

### ANNUAL GENERAL MEETING, 1943

The Annual General Meeting of the Society for the year 1943, was held at Manson House, 26, Portland Place, W.1, on Saturday, 4th December, 1943, at 2.15 p.m. Mrs. LILIAN LINDSAY (Immediate Past-President) was in the Chair.

The SECRETARY read the minutes of the previous meeting held on 27th September, which were confirmed and signed.

#### REPORT OF THE HONORARY TREASURER

Members will recall that for the years 1940, 1941 and 1942 no subscription was charged but was reimposed for 1943, which has been paid by 176 members, leaving 60 unpaid. In regard to the latter, I shall shortly propose a resolution that their names be not removed from the list of members before the 30th June, 1944.

The income for the year is £201 16s. 8d., i.e., £184 16s. from subscriptions for 1943, £1 1s. subscription for 1944, and £15 19s. 8d. from investments. Expenditure for the year is £140 13s. 5d. Surplus £61 3s. 3d.

£45 17s. 5d. has been incurred by the Committee considering orthodontic education, undergraduate and post-graduate, and the treatment of elementary school children. There is, and will be, further expenditure under this head.

The outstanding liabilities are *Transactions* 1942-3, cost of the Annual General Meeting, 1943, and expenses in connection with the Committee already referred to. These liabilities may total £85.

The insurance and property of the Society remain as in 1941-42.

The value of the Society's investments at 23rd November, 1943, is £1,220 8s. 10d., i.e., Savings Certificates £709 2s. 4d. and 2½ per cent Consolidated Stock £511 6s. 6d.

The Society also owns three cabinets for the keeping of models, etc., a three-tier sectional book case, two arm chairs, three fireside chairs, a wood curb and a writing table, worth to-day £630. All these are at Manson House except one of the cabinets (the one presented by Mr. Lewin Payne) which is in Miss Lindsay's room at 13, Hill Street, W.1. In addition to the books at Manson House, there are copies of the *Transactions* in the custody of the Hon. Librarian and some with the Hon. Secretary.

#### REPORT OF THE HONORARY LIBRARIAN

The LIBRARIAN (Mr. A. G. Taylor) stated that the preparation of a catalogue of books was well in hand and he hoped that this would shortly be available to members.

#### REPORT OF THE HONORARY SECRETARY

During the year two meetings have been held in addition to the Annual General Meeting. The two General Meetings were well attended, particularly the May Meeting, at which the demonstrations were of considerable interest. The Special Committee, appointed by the Council, as described in the last annual secretarial report, has continued its work and it is gratifying to record that one report has been completed sufficiently early to allow of full consideration of it by the Interdepartmental Committee, from whom an invitation



had been received to discuss orthodontic problems in their relation to treatment of elementary school children.

During the latter part of the year a complete overhaul of the Members List has been undertaken, as it is hoped to prepare and circulate a 1944 list before the date of the next meeting. The names of members serving in any other than a civilian capacity will be arranged in a separate section for the present, and any information relating to change of address of any of our members who have not received notice of meetings regularly will be welcomed by the secretary.

The year now terminating has been overshadowed by the recent death of Dr. G. Northcroft, our Founder and a past President, to whom fitting tribute has already been paid to-day. His passing deprives the Council of its most respected adviser, but it remains fully conscious of the trust reposed in it by him to the Council and to the general body of members who will do their best to justify his hopes and aspirations for the Society's well-being.

An Ordinary Meeting of the Society was held at Manson House, 26, Portland Place, W.1, on Monday, March 6th, 1944, at 5 p.m. Mr. S. A. Riddett, the President, occupied the Chair.

The Minutes of the previous meeting were read, confirmed and signed.

Captain Goldstein, a new member, was introduced to the President and welcomed by him.

The following candidates for membership of the Society were unanimously elected by show of hands :—

Captain S. D. Goosman, D.D.S.Penn. (U.S. Forces in Europe).

Miss E. M. Young, L.D.S.Edin., 55, Eton Rise, Eton College Road, N.W.3.

P. Rover, L.D.S.Liv., 3, Green Terrace, Rosebery Avenue, E.C.1.

An apology for absence was announced from Mr. W. G. Senior, Dental Secretary of the British Dental Association, who had been invited to attend the meeting.

The PRESIDENT welcomed the visitors who were present and asked them to consider themselves members of the Society for the evening and to take part in any discussion if they wished to do so.

# BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS

## STATEMENT OF ACCOUNTS, 1941-1942

RECEIPTS 1941-42.				£	s.	d.
By Interest on Investments	...	...	...	15	19	8
„ Debit Balance	...	...	...	49	4	8
				<hr/>		
				£65	4	4
				<hr/>		

ASSETS 1941-42.					
500 National Savings Certificates (Cost £400), Value					
1942 ... ..	...	...	...	...	692 9 0
£639 13s. 3d. 2½% Consolidated Stock (Cost £525 11s. 6d.),					
Value 17/11/42 (82.1/16)	...	...	...	...	526 2 5
Cash at Bank	...	...	...	£49 14 6	
<i>Less Suspend Account</i>				£16 16 0	
" Exchange Account				39 19 0	
				56 15 0	

Petty Cash in Hand :—	Debit Balance	...	7	0	6
Hon. Secretary	...	£2	19	11	
„ Treasurer	...	1	1	2	
					4
					1
					1
			7	0	6
					1,222
					12
					6
					7
					0
					6
					£1,215
					12
					0

PAYMENTS 1941-42.			£	s.	d.
To	Rent Manson House	...	16	11	0
"	Refreshments	...	7	16	3
"	Hon. Secretary's Petty Cash Expenses	...	3	0	0
"	Hon. Treasurer's Petty Cash Expenses	...	1	0	0
"	Insurance (Premium increased 25%)	...	1	2	6
"	Hire of Epidiascope	...	3	15	0
"	Printing	...	19	16	7
"	Reporting	...	8	8	0
"	War Damage Insurance to 31/3/43	...	3	15	0
			£65	4	4

SUSPENSE ACCOUNT.			
Members' Subscriptions for 1942	...	...	£ 15 15 0
Member's Subscription for 1940 (Seward) paid	...	...	1940
but not repaid ...	...	...	1 1 0
			£ 16 16 0
EXCHANGE ACCOUNT.			
Payment by District Valuer for War Damage			£ 39 19 0

We have examined the Books and Vouchers and certify the above Statement of Accounts to be correct.

(Signed) W. LESLIE BONESS.  
SYDNEY B. NEWTON.

November 28th, 1942.



BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS  
STATEMENT OF ACCOUNTS, 1942-1943

RECEIPTS, 1942-43.

	£	s.	d.
By Interest on Investments ...	15	19	8
„ Members' Subscriptions for 1943 ...	184	16	0
„ Member's Subscriptions for 1944 ...	1	1	0

PAYMENTS, 1942-43.

To	£	s.	a.
Rent, Manson House ...	18	6	0
Refreshments ...	7	7	4
Hon. Treasurer's Petty Cash Expenses ...	4	0	0
Dental Manufacturing Co. (Printing Transactions)	32	1	11
Printing and Stationery ...	34	5	8
Reporting ...	4	4	0
Lighting for Exhibits at Meeting ...	1	18	6
War Damage Insurance to 31/4/44 ...	3	2	6
Mr. Tavenor—present when he left the D.M. Co. Expenses for Committee Meetings:—	5	0	0
Professor Friel ...	£8	16	6
	10	10	8
Mr. N. Gray ...	10	0	0

Gestetner—Duplicating ...	29	7	2
Sundries—Stamps on Bankers' Orders and Cheque Book ...	0	10	0
Credit Balance ...	0	10	4
	61	3	3
	£201	16	8

ASSETS 1942-43.

	£	s.	d.
500 National Savings Certificates (Cost £400), Value 1943 ...	709	2	4
£639 13s. 3d. 2½% Consolidated Stock (Cost £525 11s. 6d.), Value 23/11/43 (79.15/16) ...	511	6	6
Cash at Bank ...	£92	19	9
Less Suspense Account ...	3	3	0
	89	16	9
Petty Cash in Hand:—			
Hon. Secretary ...	£1	11	6
Hon. Treasurer... ..	0	10	7
Hon. Secretary, Education Committee	0	1	1
	2	3	2
	£1,312	8	9

SUSPENSE ACCOUNT.

Two Subscriptions paid twice, once by Bankers' Order and once by Cheque (Wallis, Gardner) ...	2	2	0
Members' Subscription paid for 1942 (H. Richards). (This was not sent to him till November, 1943, as his address could not be traced until then) ...	1	1	0
The above three subscriptions will appear as repayments in the 1943-44 account ...	£3	3	0

This is to certify that we have examined the above Statement of Accounts and find it to be correct.  
(Signed) W. LESLIE BONESS.  
SYDNEY B. NEWTON.  
Hon. Auditors.  
December 2nd, 1943.



















